# FOUNDRY TRADE JOURNAL

EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 110
No. 2303
Registered at the G.P.O. as a Newspaper

JANUARY 26, 1961

Offices: John Adam House, John Adam St., London, W.C.2

Single Copy, 1/-. By Post 1/4. Annual Subscription, Home 52/-, Abroad 60/- (Prepaid)

3' × 3' SHOTBLAST CABINET

SHOTBLAST ROOMS

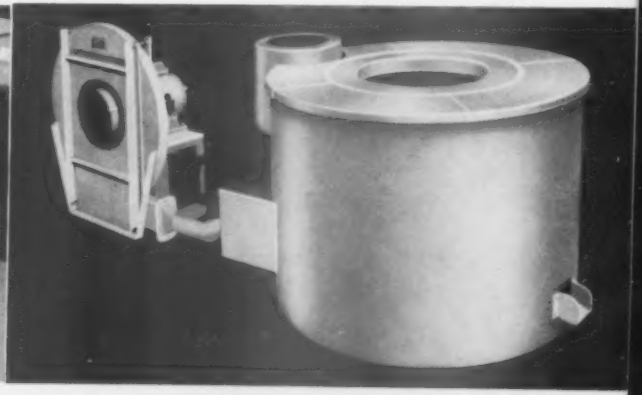
SHOTBLAST CABINETS

BALE OUT FURNACES

LIFT OUT FURNACES

CUPOLAS

16' × 8' SHOTBLAST ROOM



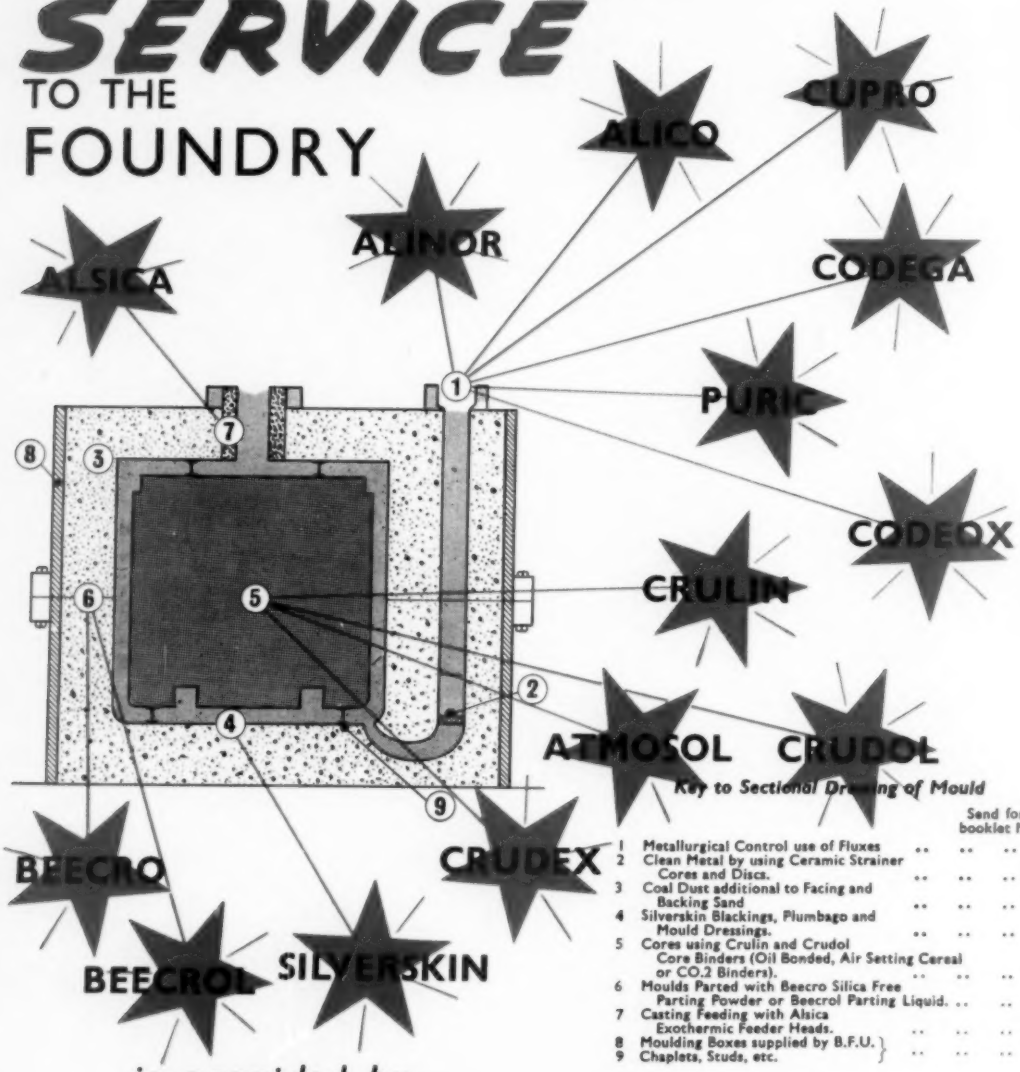
100 lbs./1000 lbs. CAPACITY OIL FIRED BALE OUT FURNACES

ELECTROGENERATORS LTD

AUSTRALIA RD., SLOUGH, BUCKS

TELEPHONE NO. 2301 & 2304

# The Only Complete SERVICE TO THE FOUNDRY




*Key to Sectional Dressing of Mould*

| | | Send for booklet No. |
|---|---|---|
| 1 | Metallurgical Control use of Fluxes .. .. .. | 3 |
| 2 | Clean Metal by using Ceramic Strainer Cores and Discs. .. .. .. | 4 |
| 3 | Coal Dust additional to Facing and Backing Sand .. .. .. | 1 |
| 4 | Silverskin Blackings, Plumbago and Mould Dressings. .. .. .. | 1 |
| 5 | Cores using Crulin and Crudol Core Binders (Oil Bonded, Air Setting Cereal or CO.2 Binders). .. .. .. | 2 |
| 6 | Moulds Parted with Beecro Silica Free Parting Powder or Beecrol Parting Liquid. .. .. | 1 |
| 7 | Casting Feeding with Alsica Exothermic Feeder Heads. .. .. .. | 4 |
| 8 | Moulding Boxes supplied by B.F.U. } | 5 |
| 9 | Chaplets, Studs, etc. } .. .. .. | |

*is provided by—*

## BRITISH FOUNDRY UNITS LTD.,

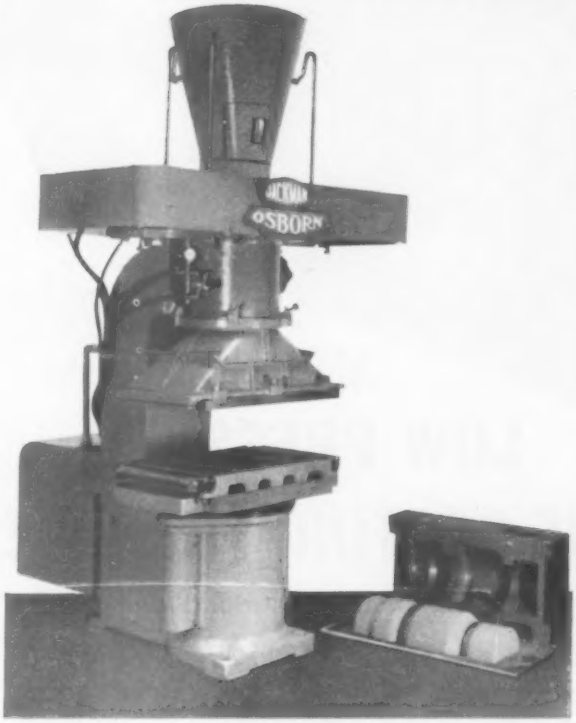
**Sole Agents for The Vortex Foundry Machines.**

*FOR THE ONLY COMPLETE SERVICE TO THE FOUNDRY*

**RETORT WORKS CHESTERFIELD**

Telephone : 4157/8 Telegrams : "RETORT"

# JACKMAN-BUILT OSBORN JET-CORE AUTOMATIC CORE BLOWER




FOR RAPID ECONOMIC PRODUCTION WITH ANY SAND

IN WOOD OR IN METAL BOXES

PUSH BUTTON OPERATION

HIGH SPEED CYCLE

JET BLOW ACTION

QUICK CHANGE BLOW HEAD AND BLOW PLATES

STATIONARY RESERVOIR

VENTED DOUBLE BLOW PLATE FOR WOODEN BOXES

TABLE HEIGHT RAPIDLY SET AND LOCKED HYDRAULICALLY

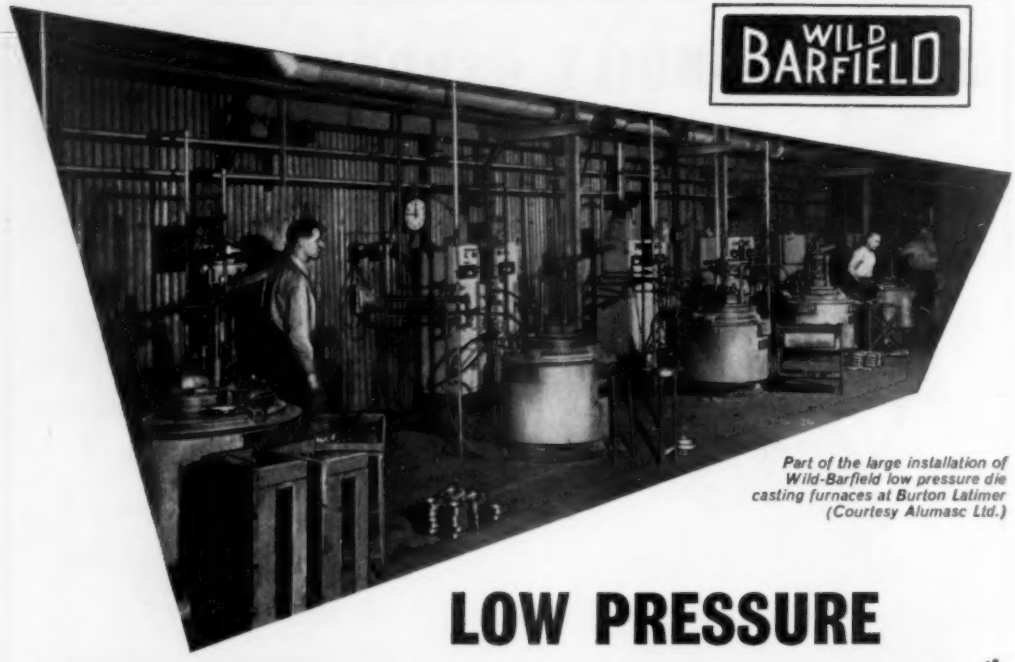
| MACH. No. | APPROX. CAPY OF CORE | CLAMP CYL. DIA. |
|---|---|---|
| 910 | 25 lbs. | 10" |
| 916 | 75 lbs. | 16" |
| 924 | 175 lbs. | 24" |

## J. W. JACKMAN & CO., LTD.,

**VULCAN WORKS · BLACKFRIARS ROAD · MANCHESTER 3**

*Telephone : DEAnsgate 4648 three lines · Telegrams : Blast, Manchester*

WILD BARFIELD



*Part of the large installation of Wild-Barfield low pressure die casting furnaces at Burton Latimer (Courtesy Alumasc Ltd.)*

# LOW PRESSURE ALUMINIUM DIE CASTING FURNACES*

*(Mains Frequency Induction Heated)*

Simple to service
No elements to burn out
No channels to clean
No metal contamination
Accurate temperature control

***Over 30 furnaces supplied to one well-known American Motor Manufacturer and currently used for production of Aluminium engine castings***

ELECTRIC WILD BARFIELD FURNACES

***FOR ALL HEAT-TREATMENT PURPOSES***

**Developed in conjunction with Alumasc Ltd. and specially designed for their low pressure die casting process.*

**WILD-BARFIELD ELECTRIC FURNACES LIMITED**

ELECFURN WORKS · OTTERSPOOL WAY · WATFORD BY-PASS · WATFORD · HERTS · TELEPHONE: WATFORD 28091

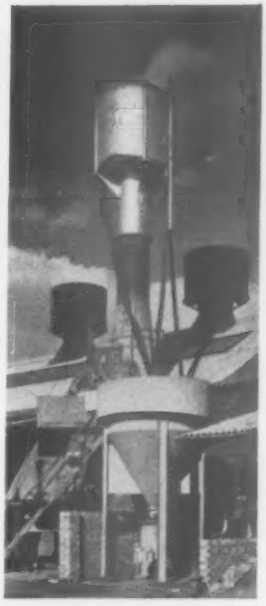
WB.III

# DUST...

## Coarse as grit . . . fine as fume; if you want to control it, collect it, separate it, extract it, the people to get in touch with are Filter-Heat Ltd.

### WHY?

For a very sound reason. They are not committed to any particular *method* of dust collection but are concerned with one thing only—the best way to trap a particular type of particle. It might be done with cyclones or multi-cyclones, cloth filters, wet collectors or reverse-jet filters —or a combination of these. Filter-Heat make them all. But for cupola emission they would install their water screen grit and spark arrester, similar to the one illustrated which is shown complete with its specially designed settling tank. They have also considerable experience in the design of hoods for the control and collection of industrial fumes, dust and grit. If you have a dust or grit problem ring them up—at Rugeley 138; Leigh, Lancs 94, or (London) Abbey 3085. The name is . . .



*The Filter-Heat water screen grit and spark arrester was operating when the photograph was taken. As you can see against the background of blue sky only steam is escaping.*

## FILTER-HEAT LTD

*(a subsidiary of Sutcliffe, Speakman & Co. Ltd.)*

**33 MARKET SQUARE, RUGELEY, STAFFS.**

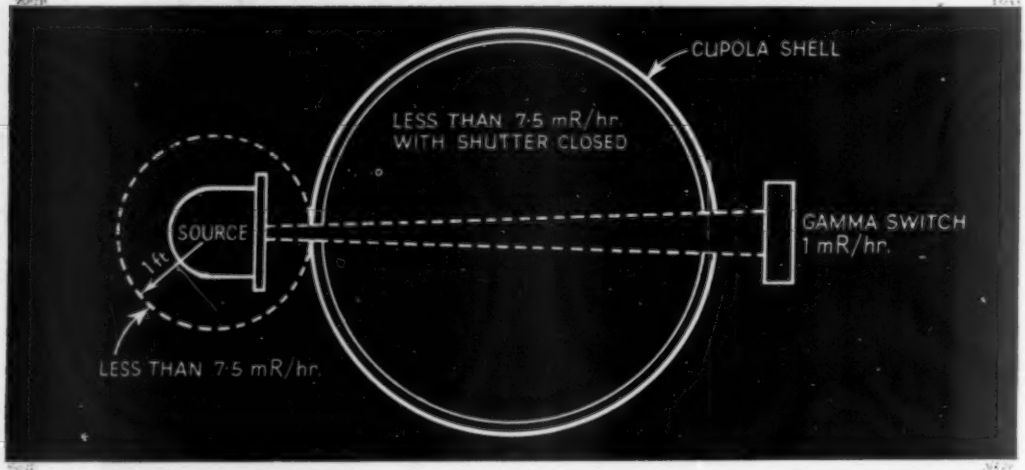
LONDON OFFICE: 2 CAXTON STREET, S.W.1. NORTHERN OFFICE: GUEST STREET, LEIGH, LANCS.

A1

# ELLIOTT-I.D.L.

## CUPOLA CHARGE LEVEL INDICATOR

The Elliott-I.D.L. charge level indicator enables cupola charging systems to be operated automatically with complete safety. It provides certain and consistent results with minimum maintenance.




*The full range of Foundry Products includes*

**Brown Boveri Mould Driers**
**Gravity Die Casting Machine**
**Reynolds Shell Moulding and Closing Machines**
**Diamond Rotary Reactor**
**Sinex Vibrating Screens, Conveyors and Knockouts**
**Sinex Vibrating Crane Beams**
**Escher Hot Blast Cupola Plants**
**Lo Smoke Die Sprays**
**Crucible Melting Furnaces**

The Elliott-I.D.L. indicator consists of a radio-isotope source and a gamma switch detector. The source is mounted in a protective housing on the cupola at the desired level and the gamma switch diametrically opposite. Rays from the isotope cross the cupola and are picked up by the detector unless they have been interrupted by iron in the charge. The detector can be used to operate signal lamps or bells or an automatic charging system. Single or two level indication can be provided.

★ *ACCURATE*
★ *CONSISTENT*
★ *SIMPLE MAINTENANCE*

*Sole Selling Agents* FAME

***FOUNDRY & METALLURGICAL EQUIPMENT CO. LTD.***
QUEENS ROAD · WEYBRIDGE · SURREY
*Weybridge 3891*

*Associated with Efco Ltd. and Stein & Atkinson Ltd.*

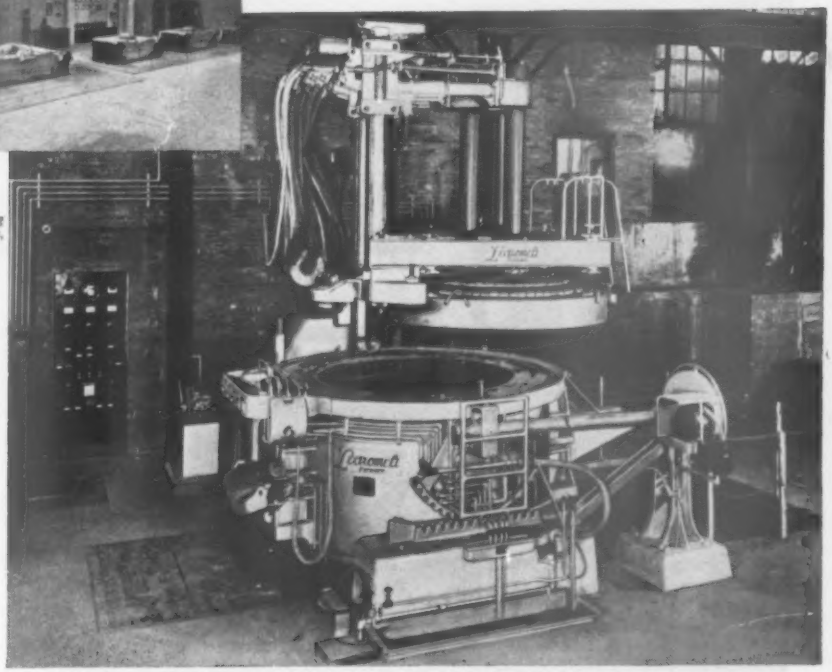
NRP 4103

GWB

DEMAG

Lectromelt

*Demag high-frequency induction furnace installation at a steel making plant, incorporating two 1 ton capacity furnaces, two 660 lb. capacity furnaces, and one 110 lb. capacity furnace.*



*A 3 ton capacity Lectromelt arc furnace of 9' 0" diameter shown with roof swung ready for charging*

High Speed and High Output are the key features in the medium and smaller range of furnaces offered by G.W.B. Furnaces Ltd. Many years of experience are behind both the Coreless and Arc Furnaces of Demag and Lectromelt designs. Daily, electric furnaces are finding wider and wider applications, and the coreless induction (crucible) type is no exception as it is an ideal medium for melting steel and iron, and all other metals. It is particularly advantageous in steel works where a charge of scrap of known analysis is melted and is an installation that pays for itself in a very short time. The proven economies of operation of electric arc furnaces offered by G.W.B. have earned an enviable reputation, and a few of their outstanding features are:—

Separately mounted roof lift and swing mechanism for top charging; Four point roof suspension of the roof ring; Electrode holders of the power operated, spring-held, air release type; High speed movement of the electrodes; Offset rocker centres to return furnace from extreme tilt in event of power failure.

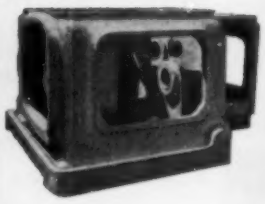
GWB

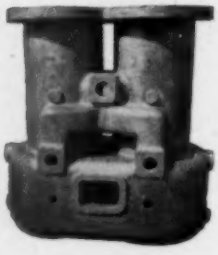
**G.W.B. FURNACES LIMITED**

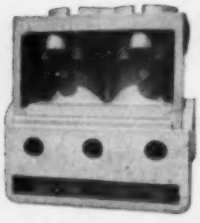
P.O. BOX 4 · DIBDALE WORKS · DUDLEY · WORCS. *Telephone: Dudley 55455*

Proprietors: Gibbons Bros. Ltd., and Wild-Barfield Electric Furnaces Ltd.

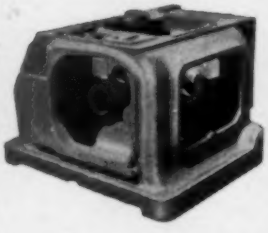
All these intricate iron castings were produced by Robert Cort & Son Ltd., Reading, using $CO_2$ for core and mould hardening and Isopropyl Alcohol as the base for the flash dressing. You can get this sort of result simply and consistently in your foundry too.

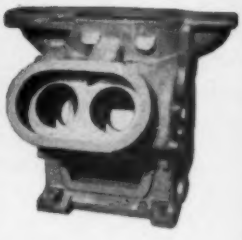


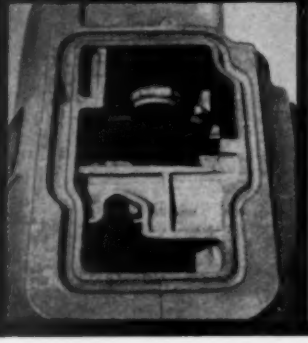




DCL



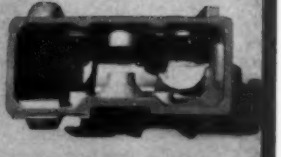




CARBON DIOXIDE
and
ISOPROPYL ALCOHOL

are available in all quantities and can be delivered by bulk road tanker.

Please address your enquiries to
The Distillers Company Limited,
Chemical Division,
Devonshire House,
Mayfair Place,
Piccadilly,
London W.1.
Telephone : Mayfair 8867



TA 2570

**IT'S RUDE TO POINT!**

*On the other hand we feel we must bring to your attention our facilities for producing both sand and machine cast high quality refined iron. Our scientific approach to customers' specifications ensures we "home on our target" every time, no matter how exacting our customers' requirements.*

**BRADLEY & FOSTER LIMITED**

**FOR QUALITY CONTROLLED REFINED PIG IRON**

**DARLASTON · STAFFORDSHIRE**

**Telephone: JAMes Bridge 2353 (7 lines) Telegrams: BRADLEY DARLASTON**

*A member of the Staveley Coal & Iron Co. Ltd. Group*

**ACCURATE**
**CORES & MOULDS**
**in**
**10-15**
SECONDS
**by the**
**HOT BOX PROCESS**
**using**
**THOR**
**FOUNDRY RESINS**

*Manufactured by*
**LEICESTER, LOVELL & CO. LTD.**
NORTH BADDESLEY, SOUTHAMPTON
TEL: ROWNHAMS 2131 (8 LINES)

cured in the box

using conventional foundry equipment

high-speed production

detailed in TECHNICAL SERVICE BULLETIN 519 -get a copy and work out some costs. You'll be amazed

To LEICESTER, LOVELL & CO. LTD.
NORTH BADDESLEY, SOUTHAMPTON

Please send me Technical Service Bulletin 519.

Name _____

Company _____

Address _____

_____ F.T.I.

# *Here's a* NEW *Blacking*

**– and it's a**

# WINNER!

## Nº 47

**Nº 47 is not 'just another Blacking'! It is an entirely new type of Blacking and has been fully approved by some of the largest Foundries in the Country. Foundries making really large moulds in Loam or Dry Sand will find it an exceptional blackwash in every way —no limit to weight and *no* section too thick to produce a perfect strip.**
**It is adequately bonded and has good penetration.**

**– the ACE of BLACKINGS – a *FREE* sample on request.**

## WILLIAM CUMMING & CO. LTD.

HEAD OFFICE
KELVINVALE MILLS MARYHILL GLASGOW N.W.
Telephone: MARyhill 1033/4

BRANCHES AT:
FALKIRK
Telephone: FALKIRK 161

CHESTERFIELD
CHESTERFIELD 5314/5

DEEPFIELDS
BILSTON 41203/4

# 1961 to 1970

## *melting programme*

## Have you considered HOT BLAST?

**VEW HAVE INSTALLED PLANTS**

With melting rates from 1 ton hour to 30 tons hour.
For continuous operation 24 hours per day.
Fully water cooled.
For Recuperative operation.
For direct oil or gas fired operation.
With cast iron tube Recuperators.
With steel tube Recuperators.
Melting 100% steel scrap.
For duplexing purposes.
With low coke consumption.

**VEW**

***HOT BLAST PLANTS***

***RECUPERATORS FOR INDUSTRIAL FURNACES***

★ ***Over 100 VEW Plants in operation at home and abroad.***

**Fuel and Metallurgical Processes Limited., Normanhurst Chambers, 21 St. James Road, Dudley, Worcs.**

*Telegrams: Fuemetpros, Dudley.* *Telephone: Dudley 54649 & 53751*

F.13

# JAGUAR CARS

use

# Foseco*

**WORLD WIDE** SERVICE FOR FOUNDRYMEN

**FOSECO INTERNATIONAL LIMITED**

*Long Acre, Nechells, Birmingham, 7 England*

Phone: EASt 1911 (10 lines) Grams: KUPRIT, Telex B'ham

**Jaguar endurance demands exacting standards of workmanship. So Foseco products are regarded as essential by West Yorkshire Foundries Limited who cast Jaguar cylinder heads**

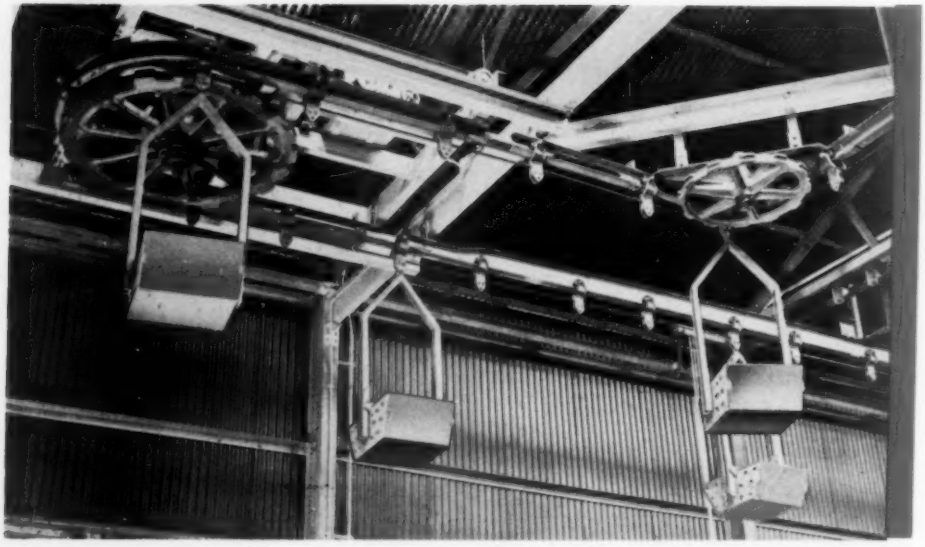
* Registered Trade Marks

**Flexible, simple and smooth in operation . . .**

# *The new* FE-LINE

## OVERHEAD WIRE ROPE CONVEYORS

***(Segmented, NOT continuous rope)***



The smooth and efficient running of the FE-LINE Overhead Conveyor gives you a system of greater flexibility combined with simplicity. The FE-LINE has a minimum of wearing parts and "Sealed" or life" bearings, is equally at home in dusty atmospheres or potteries or where the most stringent cleanliness has to be observed, i.e., Food and Bottling Factories and other industries. For operation, lubrication is confined to a minimum. Power requirements are low and operation is smooth, clean and quiet. Let us solve your handling problems. Please write or telephone.

● **Easily installed.** ● **Little maintenance required.** ● **Capacity 10-600 lbs.**

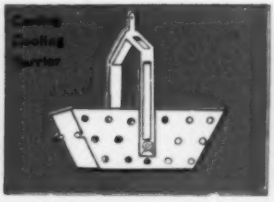
FE-LINE
STRONG AND SINUOUS

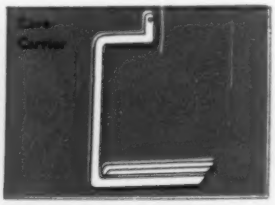
## FE-LINE
### OVERHEAD WIRE ROPE CONVEYORS

**CONVEYOR AND SHOTBLAST LIMITED**

LEIGHTON BUZZARD, BEDFORDSHIRE

Telephone : Leighton Buzzard 2441 Telegrams : 'Impact' Leighton Buzzard





FE-LINE CARRIERS
Let us design and manufacture your carriers for use on FE-LINE Conveyors.

# AUTOMATION IN THE FOUNDRY

BMD

THROUGH-
TYPE JOLT
SQUEEZE MOULDING MACHINES,
TYPE DFP

with moulding box pushing-in device, sand filling device, shock(ing) jolter, heavy duty press as well as roller lifting arrangement.

Capacity up to about 350 mould parts per hour according to the size.

TWO THROUGH-TYPE JOLT SQUEEZE MOULDING MACHINES, Type DFP 1, in a fully automatic moulding unit with turnover device, assembling device, pushing out device etc., with driven roller conveyors. Capacity of this plant 500 moulding box parts.

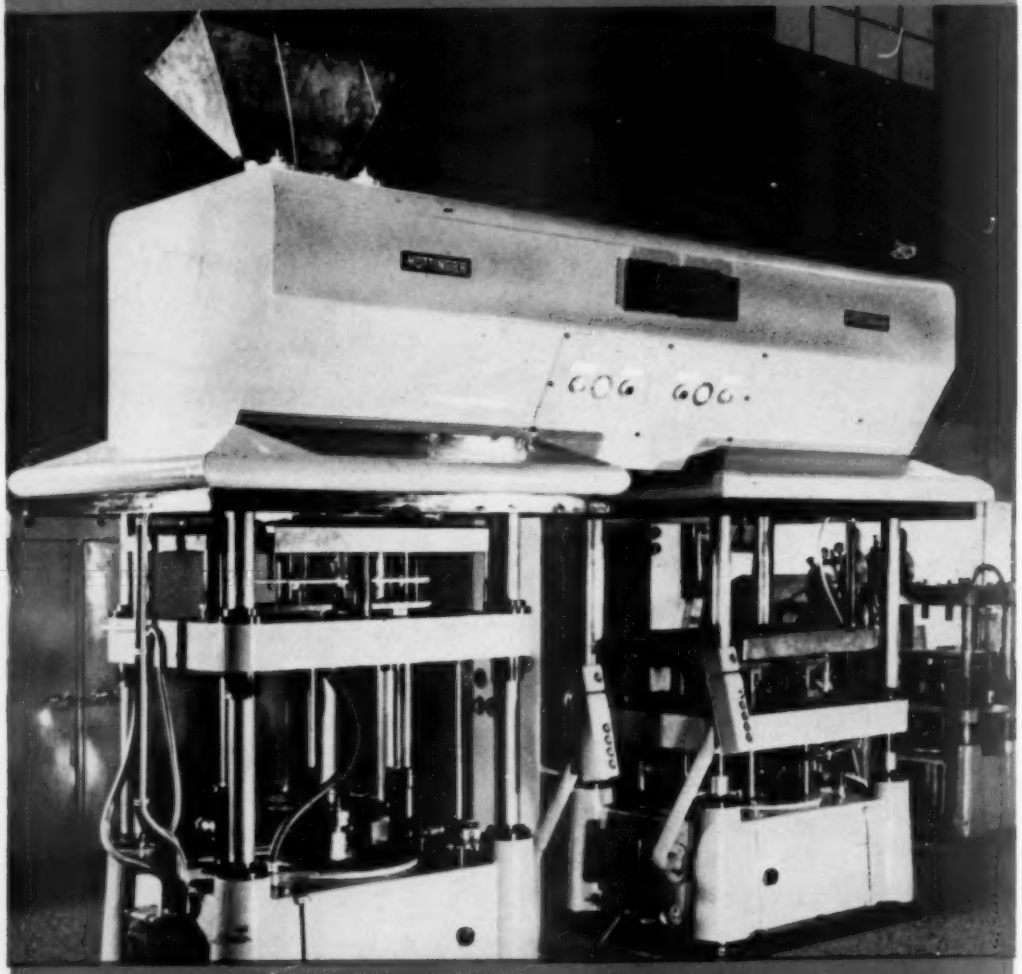
We plan and design partly and fully automatic foundry plants and individual machines in any size and for any output. Sand conditioning plants . transport plants . moulding machines slingers . automatic moulding units . SHOT BLAST ROTOR machines . hydraulic fettling installations . dipole furnaces . charging plants . dust arresting plants.

Please write for leaflets and quotations.

BADISCHE MASCHINENFABRIK A.-G.
Seboldwerk
KARLSRUHE-DURLACH

Representatives in the British Isles: Speedways Development Limited, 2295 Coventry Road, Sheldon, Birmingham 26, England.
Representatives in India: The Bombay Co. (Private) Ltd., P.O. Box 1081, Bombay 1, India.

# HOTTINGER SHELL MOULDING Machines



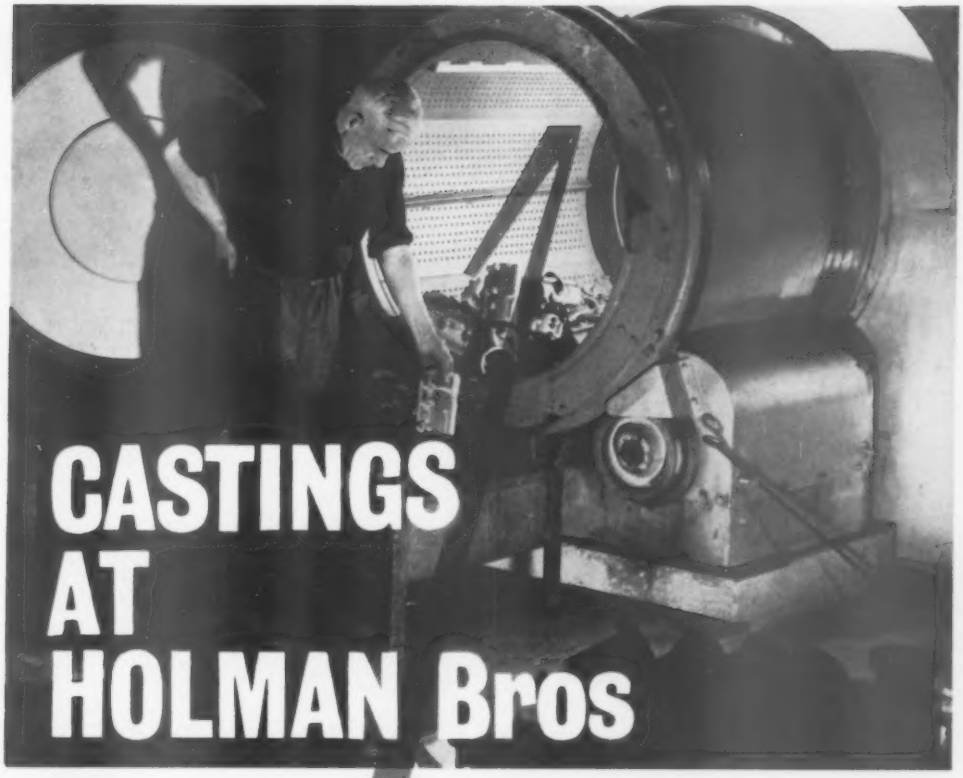
SHELL—and CORE SHOOTING MACHINE

1 Operator 36" × 28" Fully or Semi-automatic

*As installed for the manufacture of Cores for Cylinder Blocks.*
*Maximum Core Dimensions 48" × 32"*

**VERROLEC LTD.**

731 North Circular Road,
Cricklewood, LONDON, N.W.2.
Telephone: GLAdstone 0623/4/5.
TELEX 23657



# CASTINGS AT HOLMAN Bros

## GET QUICK THOROUGH BLAST CLEANING *with the* CENTRIBLAST

Intricate castings manufactured at the Camborne foundry of Messrs. Holman Bros. are quickly and thoroughly cleaned inside and outside by the Centriblast Barrel, illustrated above.

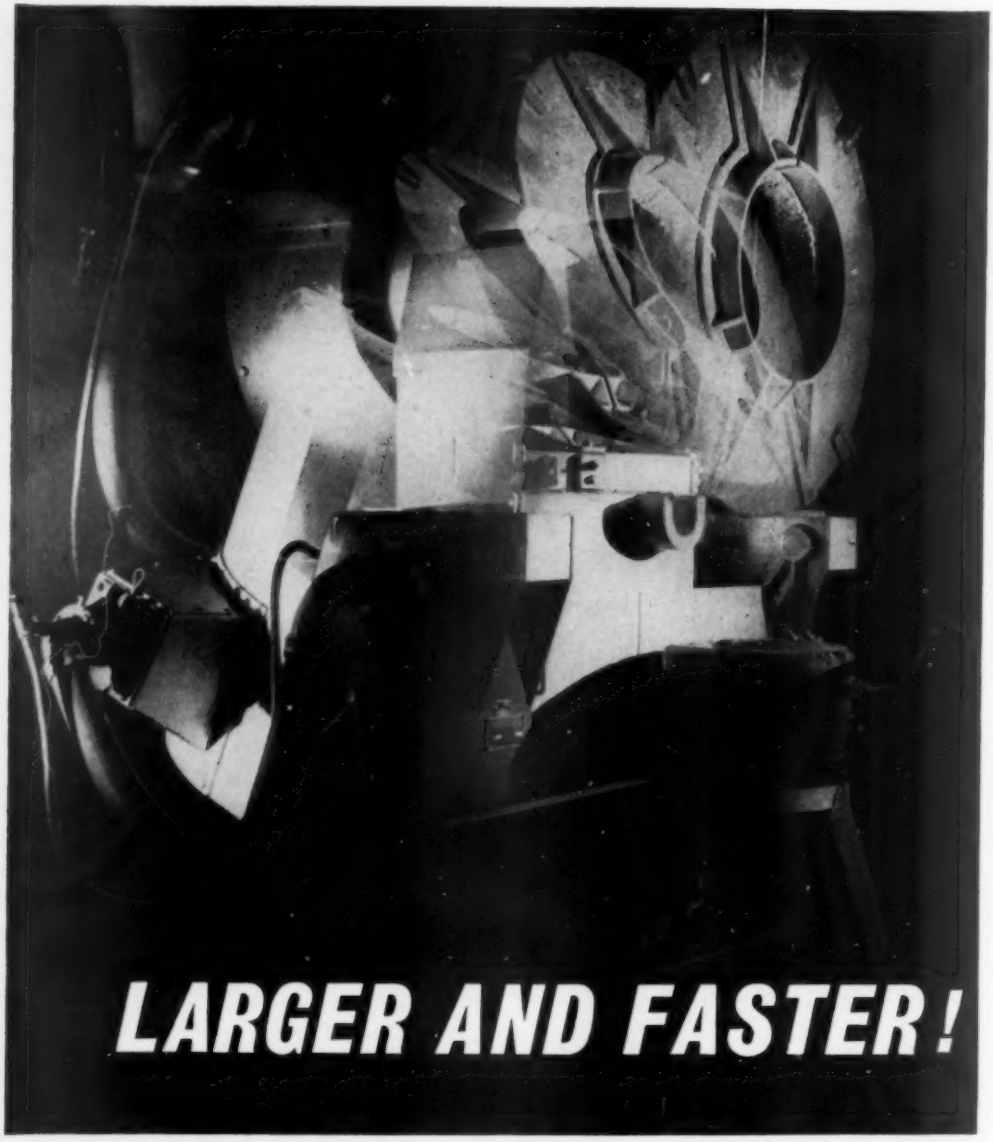
The unit, one of over five hundred giving satisfaction throughout the world, has been in operation since 1952 helping to maintain the impeccable standard set by Holman Bros.—whom we gratefully thank for permission to reproduce the photograph.

We will gladly demonstrate the possibilities of the Centriblast Barrel on your own work—please contact us to arrange the details.

**AIRLESS ROTARY BARREL CLEANING MACHINE**

**SPENCER & HALSTEAD LTD.,** BLAST CLEANING DIVISION OSSETT, YORKSHIRE.

*Pouncey/S.27*




**THE NEW BULK MELTER – MORGANS 1300 BASIN TILTER**

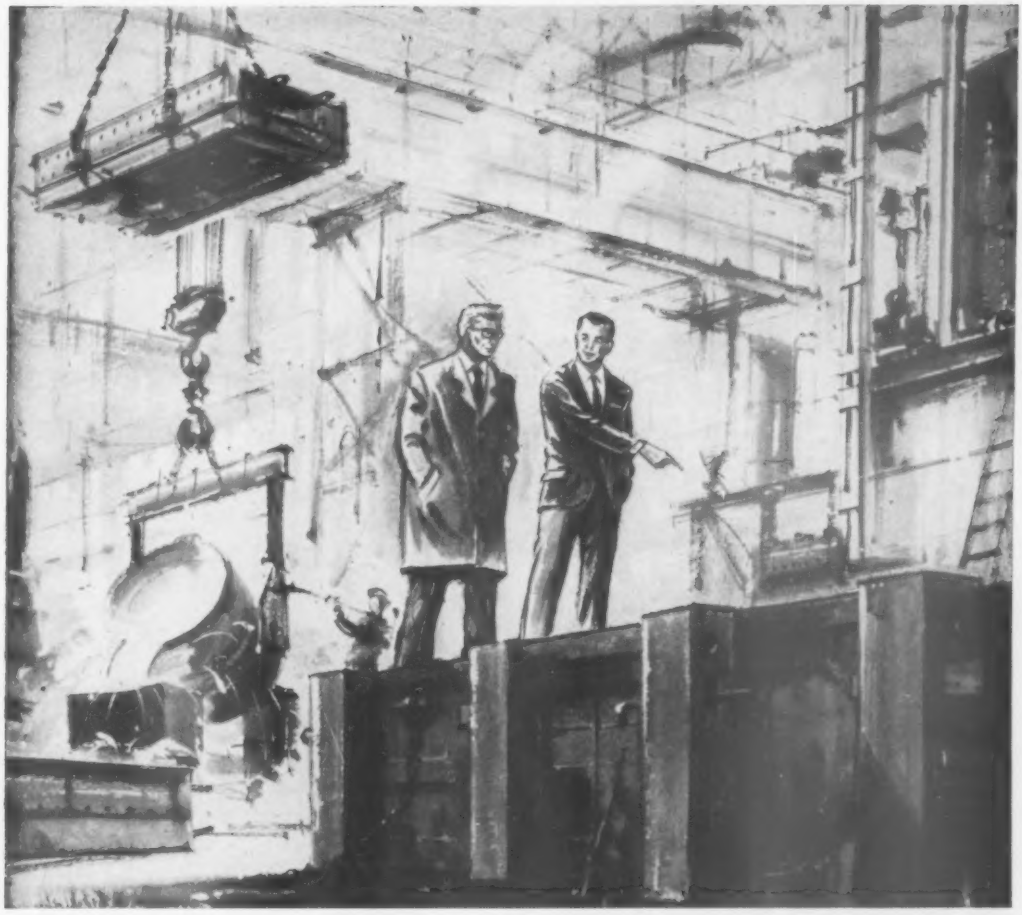
1300 lb of Aluminium in the hour! Come and see it
at the Battersea Test Foundry or ask our Representative to call.

MORGANS

THE CRUCIBLE DEPARTMENT

THE MORGAN CRUCIBLE COMPANY LIMITED,
NORTON WORKS, WOODBURY LANE, NORTON, WORCESTER.
Telephone: Worcester 26691. Telegrams: Crucible, Worcester.

F53A



# Why should this man tour your foundry with you?

He's the man from Catalin, specialists in the development and manufacture of foundry products — willing and able, moreover, to advise upon their applications. What he has to say is important to you, because he can show you how Catalin materials will improve your castings — and save you money. A day with him is a day well spent. Call in the Catalin man to discuss your problems.

*Write or telephone:*

**CATALIN LIMITED,** Waltham Abbey, Essex. Telephone: Waltham Cross 23344

**CATASET**

*Air Setting Resin Binder—*

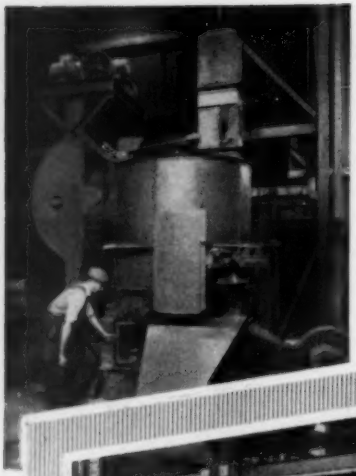
*For better casting*

*finish and*

*reduced fettling costs*

Catalin Limited

FTC

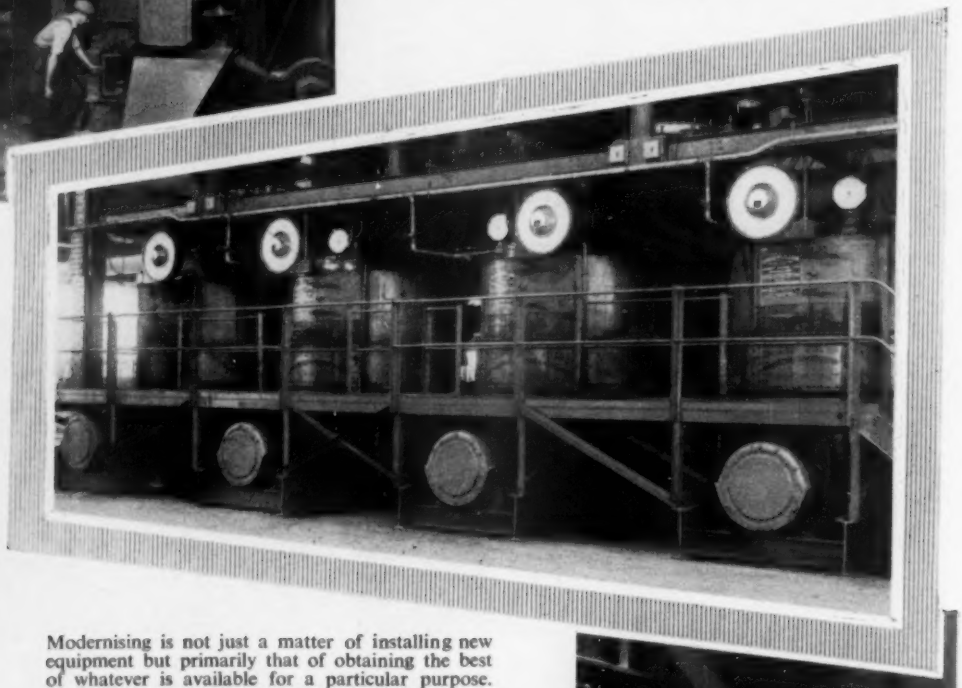


*More and more modern foundries*

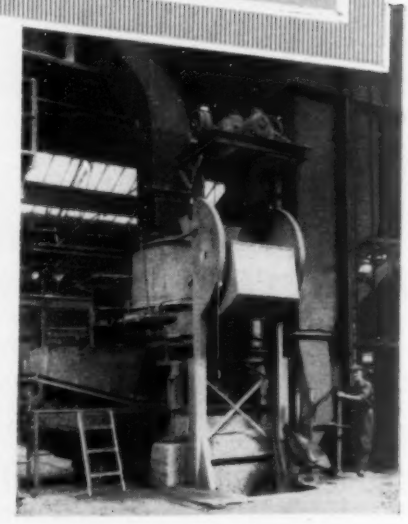
*are specifying the*

# *SPEED*MULLOR

*to mull their mould or core sand*



Modernising is not just a matter of installing new equipment but primarily that of obtaining the best of whatever is available for a particular purpose. That is why more and more modern foundries choose the Speedmullor for the preparation of their sand. One single foundry in this country operates 10 Speedmullors and one multiple company uses 14. More foundry sand is mulled in Speedmullors than by any other method because, only Speedmullor mulling can develop the full physical properties of moulding sand and core sand mixtures with minimum bond and at lowest cost per ton of sand mulled. Full development of physical properties with maximum Speedmullor uniformity and control provides higher quality castings with better surface finish and the elimination of casting defects.



*Made under licence from*

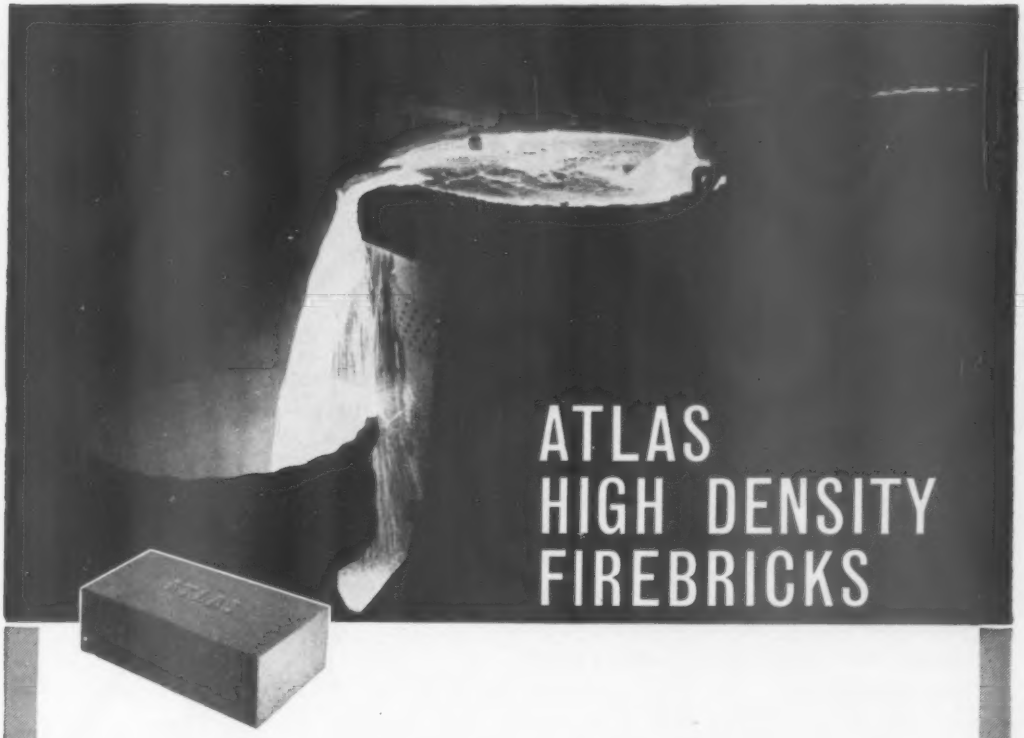
*BEARDSLEY & PIPER, CHICAGO*

*by*

**HERBERT MORRIS LIMITED**

**P.O. BOX 7**

**LOUGHBOROUGH ENGLAND**




No firebrick can withstand high temperatures and heavy loads indefinitely.

But **ATLAS HIGH DENSITY** Firebricks have the maximum life possible under such conditions. They have been produced specifically for ladle linings and are quite unique in their performance in bottoms and the striking areas. High crushing strength and great resistance to penetration, erosion and abrasion have been combined to ensure a long working life.

Use **ATLAS HIGH DENSITY** Firebricks and line less often.

**ILLUSTRATION**

Tapping a furnace at Abbey Melting Shop, Steel Company of Wales Ltd. Ladle Bottoms are ATLAS Firebricks.

**UNITED FIRECLAY PRODUCTS LTD**

BATHVILLE · ARMADALE · WEST LOTHIAN

REGISTERED OFFICE · 140 West George Street · Glasgow C.2

Telephone: ARMADALE 313-316 Telegrams: "Combined" Armadale

A MEMBER OF THE WOODALL-DUCKHAM GROUP OF COMPANIES

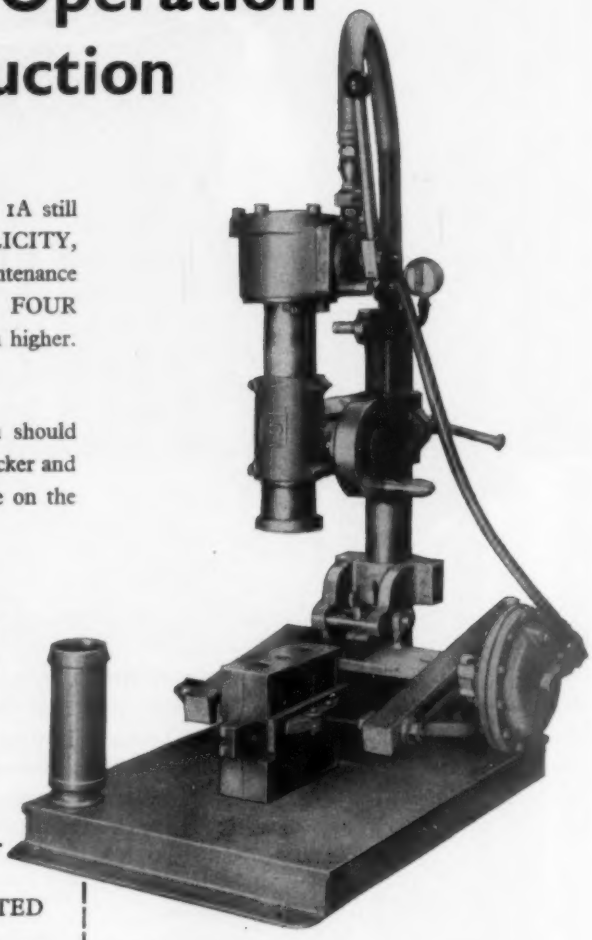
# The *NEW* Redford No. 1A

## Single Lever Operation Higher Production

The New Single Lever Redford No. 1A still retains its STRENGTH and SIMPLICITY, but reduces operational time, maintenance costs and labour fatigue. With FOUR operations in ONE production is even higher.

If you make cores up to 2 lbs. you should use a Redford. It will make them quicker and cheaper than any comparable machine on the world market today.

It has great adaptiveness and is used widely co-operating the $CO_2$ process and the design provides rapid action to all adjustable parts, including the pneumatic clamps.



*To* BRITISH RONCERAY LIMITED

*Please send me further details of the Redford Core Blower/Redford Pneumatic Clamp without obligation.*

Name .....

... .....

*Just attach to one of your letter-headings and post to-day to:—*

**BRITISH RONCERAY LIMITED**

**14, WOLSELEY ROAD, SHEFFIELD 8**

# FOUMEC

## 5 PROCESSES IN 1

1. Screening
2. Magnetic Extraction
3. Automatic Loading
4. Milling and Mixing
5. Disintegrating and aerating

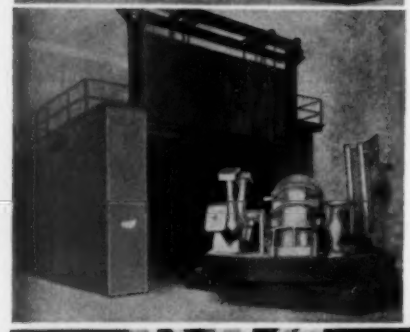
The outstanding features of the above Batch type Facing Sand Unit can be summarised as follows:—

(a) High performance, 2 tons facing sand per hour.
(b) Utmost efficiency.
(c) Very versatile, can cater for facing sand, core sand, $CO_2$ sand.
(d) Ideally compact. Length 14' 6", width 6' 0", height 12' 6".
(e) Most economical.

**FOUNDRY MECHANISATIONS (BAILLOT) LTD.**

*Main Offices & Works:* DENBIGH ROAD, BLETCHLEY, BUCKS.

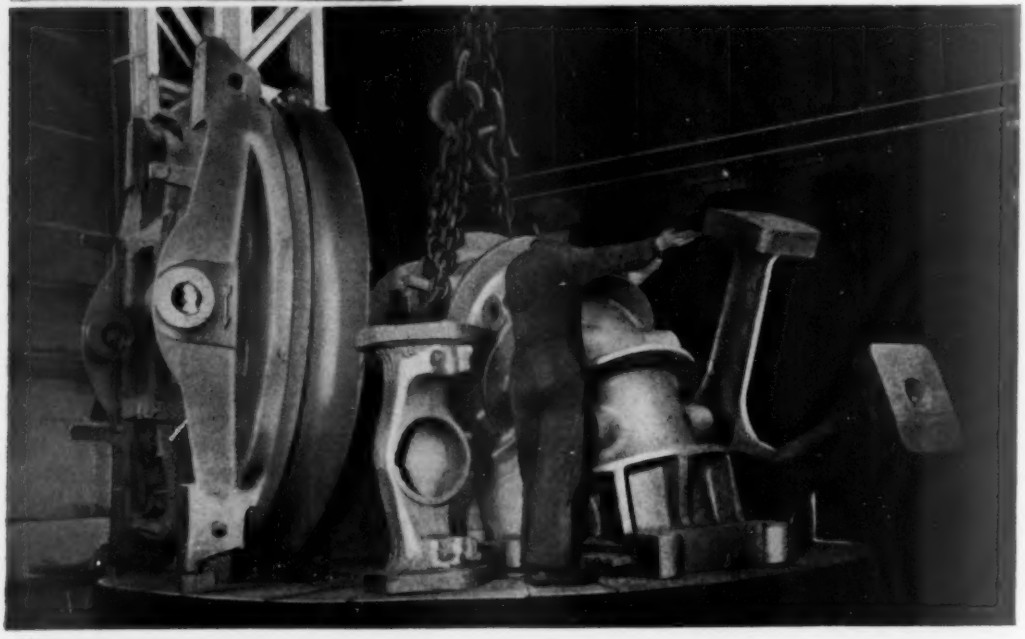
*Tel.:* BLETCHLEY 3354 *Regd. Office:* 29, CROMWELL ROAD, LONDON, S.W.7. *Grams:* "FOUMEC" BLETCHLEY.



# The World's Largest Mechanical

## Shot Blast Room Plant

The Tilghman's Wheelabrator Room Plant shown in the accompanying illustrations is 30ft. by 25ft. by 16ft. high, and is installed at Messrs. F. H. Lloyd and Co. Ltd., Wednesbury. This plant, which is fitted with five Wheelabrator units, handles the production from two large bays, the components being loaded on to a bogie equipped with a circular table. Rotating and oscillating motions are provided to the bogie during the cleaning cycle, ensuring maximum blast coverage.



**TILGHMAN'S LIMITED BROADHEATH ALTRINCHAM CHESHIRE**

LONDON OFFICE: 1 Chester Street, S.W.1. A member of the Staveley Coal and Iron Co. Ltd. Group

AGENTS: MIDLANDS: R. J. Richardson & Sons Ltd., Commercial Street, Birmingham, 1.
SCOTLAND: Balbardie Ltd., 227 Bath Street, Glasgow C.2. : 110 Hanover Street, Edinburgh 2.
NORTHERN IRELAND: Stewart Industrial Services, Ltd., 129, Ormeau Road, Belfast.

W.179

# CUT COREMAKING COSTS
## BY THE USE OF
# V & S CORESHOOTING MACHINES

YOU MAY SHOOT A CORE EVERY 5 SECONDS.

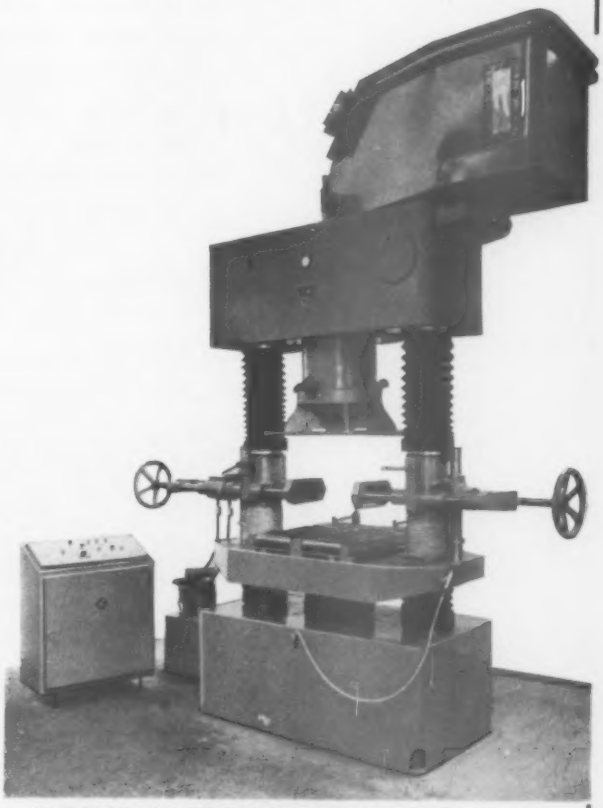
SIX SIZES OF MACHINE ARE AVAILABLE TO MAKE CORES FROM 1½ OZS TO 180 LBS IN WEIGHT.

FAST FOR MASS PRODUCTION YET ECONOMICAL FOR SHORT RUNS.

ROBUST CONSTRUCTION GUARANTEES THE MINIMUM OF MAINTENANCE.

UNSKILLED LABOUR CAN PRODUCE LARGE QUANTITIES OF COMPLICATED CORES.

**SIMPLIFY YOUR COREMAKING PROBLEMS FOR A LOW CAPITAL OUTLAY BY INSTALLING V & S CORESHOOTERS NOW.**



THE TURBO-MATIC SHOOTER FOR CORES OF UP TO 180 LBS IN WEIGHT.

SOLE U. K. AGENTS FOR MESSRS. VOGEL & SCHEMMANN

METAQUIP

**METALS & EQUIPMENT (W'TON) LTD.**

DRAYTON STREET · WOLVERHAMPTON

TEL.: WOL. 23581
GRAMS.: METAQUIP

# SINCE 1947

**ONE WALSALL FOUNDRY HAS PURCHASED 2,950 PAIRS OF 'TALBARD' MOULDING BOXES.**
**A LARGE NUMBER OF THESE BOXES WERE MADE WITH ONLY ·003" PIN CLEARANCE.**
**OUR CUSTOMERS ASSURE US OF THEIR COMPLETE SATISFACTION—**

# WHY?

E. TALLIS & SONS LTD
MANUFACTURERS OF "TALBARD" MOULDING BOXES
TALBARD WORKS
CHARLES HENRY STREET
BIRMINGHAM · 12
PHONE MIDLAND 4387

ASK FOR LEAFLET
No. 215N

# d u r a b i l i t y

*Solid ribbed hot-rolled steel sections re-inforced externally enable these boxes to resist the roughest usage for the maximum period . . . prolonged if a Shakeout Machine is used.*

Sterling

STERLING FOUNDRY SPECIALTIES LTD., BEDFORD, ENGLAND

# AUTOMATIC

## JOLT-SQUEEZE PNEUMATIC MOULDING MACHINE

THE MACHINE WITH THE

## 15 SECONDS

AUTOMATIC CYCLE

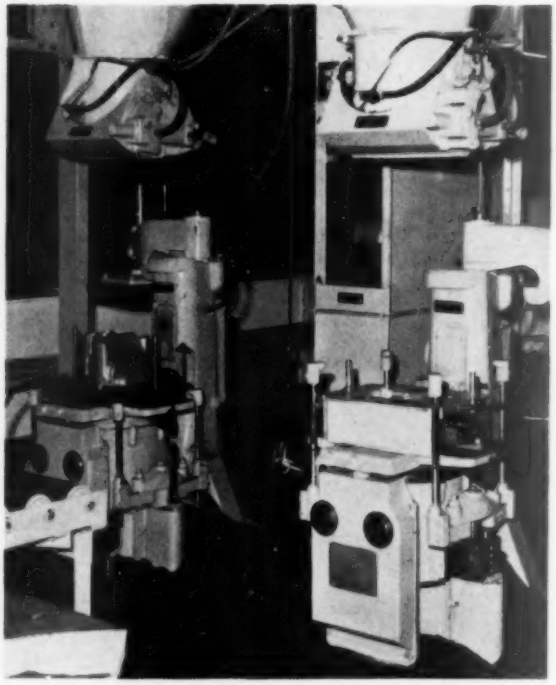
**SEE IT OPERATING IN OUR LEIGHTON BUZZARD FOUNDRY**

***SEND FOR LEAFLET 146***

- Automatic head swing, jolt, squeeze and draw.
- Number of jolts, depth of draw and vibration time variable as required.
- 1½" or 3" stroke jolt as required.
- Recommended maximum box 24" × 18".
- Maximum pattern draw 9".
- J.P.M. 2 available for larger boxes (also as non-automatic machines N.A.J. 1-2).
- Roller strip—optional extra.
- No pit required.

***OVERSEAS COMPANIES***

**FOUNDRY EQUIPMENT (Australia) PTY. LTD.**
**P.O. Box 237C, G.P.O., Adelaide, South Australia.**
**FOUNDRY EQUIPMENT COMERCIAL ESPANOLA S.A., General Goded 42, Madrid 4, Spain**
**F.E. (North America) LTD.**
**47 Advance Road, Toronto 18, Canada.**
**F.E. (South Africa) PTY. LTD.**
**P.O. Box 3929, Johannesburg, South Africa.**



*A pair of J.P.M.1's, with Pneumatic Hopper Gates, producing very deep moulds (straight draw, no rollover)*

**FOUNDRY EQUIPMENT LTD.**

LEIGHTON BUZZARD · BEDFORDSHIRE · ENGLAND

66/B

# The H.E.B.-I.

**BOXLESS HYDROIL-ELECTRIC HIGH-SPEED MOULDING MACHINE**

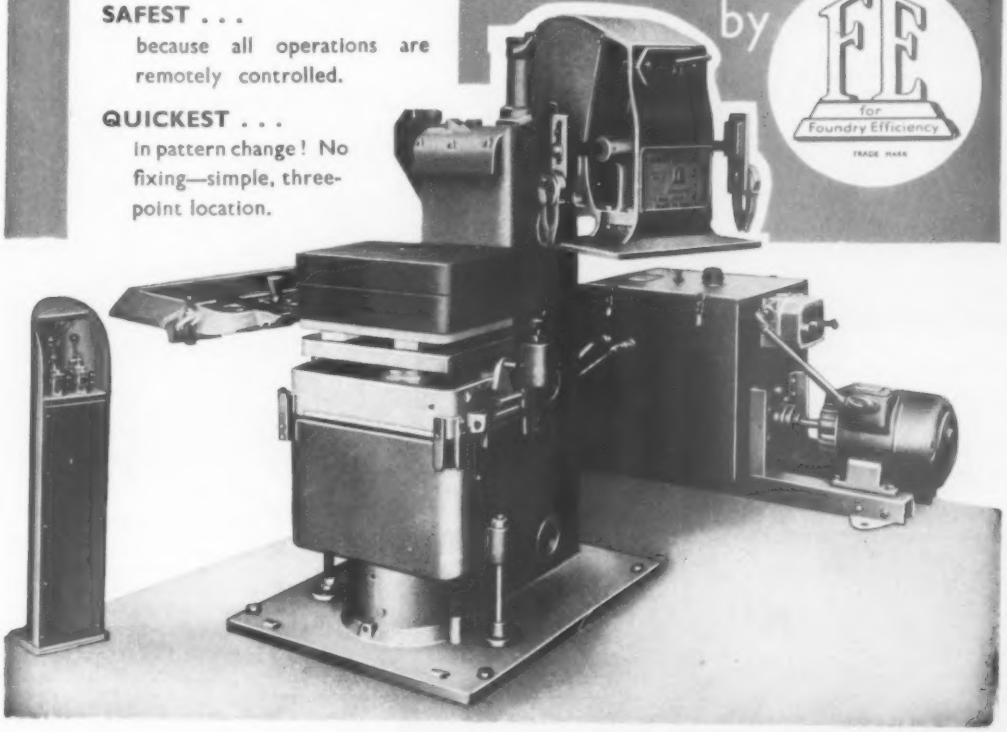
by FE for Foundry Efficiency TRADE MARK

**FASTEST . . .**
in its class, this machine out-produces any other moulding machine in the world!

**SMOOTHEST . . .**
a completely independent oil pump unit ensures powerful, positive and precise operation.

**SAFEST . . .**
because all operations are remotely controlled.

**QUICKEST . . .**
in pattern change! No fixing—simple, three-point location.



BRITISH PATENT *No. 748551.*

*SEND NOW FOR FULLY ILLUSTRATED LEAFLET No. 151*

**FOUNDRY EQUIPMENT LTD.**

LEIGHTON BUZZARD · BEDFORDSHIRE · ENGLAND

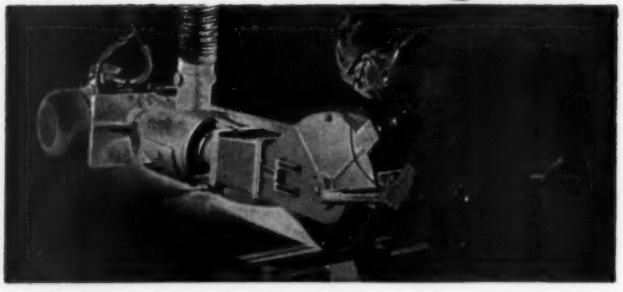
**FOR IRON FOUNDRIES**
Wheel hoods as developed by the British Cast Iron Research Association can be fitted.

## ALL COMPLYING WITH THE 1953 IRON & STEEL FOUNDRIES REGULATIONS

Luke & Spencer Ltd., manufacture a large range of pedestal and swing frame grinders with wheels from 12 inches to 36 inches diameter.

This 16 inch high speed swing frame grinder completely eliminates the dust problem. The dust is taken up at the point of suspension to ensure machine control and balance. It has been filmed in operation by the Factory Inspectorate and complies with all revelant regulations.

**FOR STEEL FOUNDRIES**
Wheel hoods as developed by the British Steel Castings Research Association can be fitted



# Luke & Spencer Ltd.

VIADUCT WORKS, BROADHEATH, ALTRINCHAM, CHESHIRE.

*'Phone Altrincham* 3281 *'Grams: Emery, Altrincham*

# Investigate these NEW

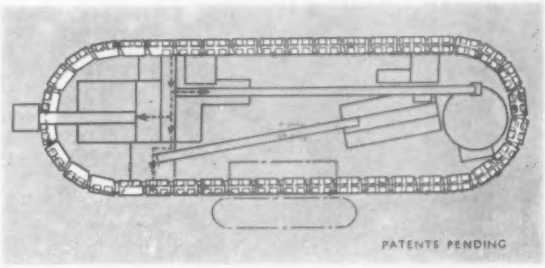
**BARTLETT B-SNOW**
CLEVELAND 5, OHIO

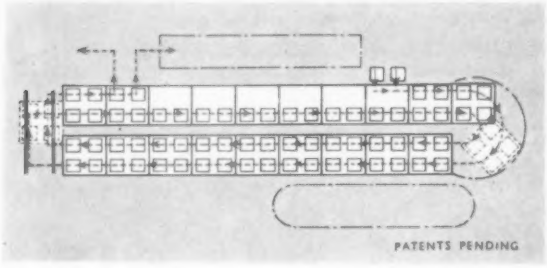
## Mould Handling Systems

*Unique and Practical*

### "Double MLC" Mould Handling System

Snap or tight flask moulds are set out in outside position on the car, poured, and travel almost completely around the loop. They are then transferred automatically to inside position on the car, and continue around the loop again for automatic removal at the shakeout. These new systems provide almost twice the cooling time of a conventional mould conveyor carrying only a single line of moulds; effecting substantial savings in floor space, equipment, building, and other facilities.



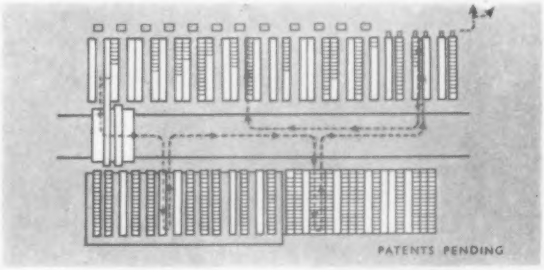




### "Double MRI" Mould Handling System

Rectangular loop, consisting of two straight runs connected with a rotary turn and transfer car. Cars advance one car length, then remain stationary for timed period so large moulds can be loaded onto the conveyor, poured, and the moulds removed, while the conveyor is stationary. Moulds are carried side by side on the cars and make almost two complete trips around the loop, thus nearly doubling the cooling time per square foot of floor space.

### "MF" Mould Handling System

Unlimited flexibility for jobbing foundries. The transfer car delivers pallets loaded with similar moulds, to the pouring, cooling, and shakeout zones, and returns the pallet with the bottom boards and bands—or flasks—to the moulding area. Handling similar moulds together permits moulds for different castings to be kept separate, and even poured with different metals, without interfering with other groups of castings. Slow jobs do not hold up the fast jobs. Moulding, pouring, cooling and shakeout are centralized, minimizing the equipment requirement.




***Write today for a copy of Bulletin No. 135. It gives full details about eight different types of Bartlett-Snow Mould Handling Systems.***

MANUFACTURED UNDER LICENCE BY

# ACME CONVEYORS LTD

**ACME CHAMBERS, BRADFORD STREET, WALSALL**
**GLASGOW AND HILLINGTON**

# SCRAP DISPOSAL

COX AND DANKS LIMITED

| BIRMINGHAM | MANCHESTER | SHEFFIELD | LONDON |
|---|---|---|---|
| Scapa Works | Frederick Road | Stevenson Road | Scapa House |
| Langley Green | Pendleton | Attercliffe | Park Royal Road |
| Oldbury, Birmingham | Salford 6 | Sheffield, 9 | London N.W.10 |
| *Tel: Broadwell 1611* | *Tel: Pendleton 2481* | *Tel: Sheffield 41216* | *Tel: Elgar 5811* |
| *Telex 33183* | *Telex 66448* | *Telex 54205* | *Telex 25239* |

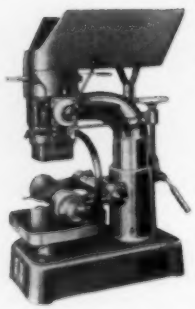
*And at Newcastle, Bedford, Cardiff, Bow, Coventry and Belfast.*

A METAL INDUSTRIES GROUP COMPANY

S12

HANSBERG *Coreshooters*

**For Denser Cores and Faster Production**



TYPE H 2lbs.

**Extended core box life.**

**Minimum venting problems.**

**Minimum air consumption.**

**ROY EVANS** M.I.B.F.

***(Coreshooters Sales Ltd.)***

**44, PRESTBURY RD., CHELTENHAM.**

Telephone: CHELTENHAM 55105.

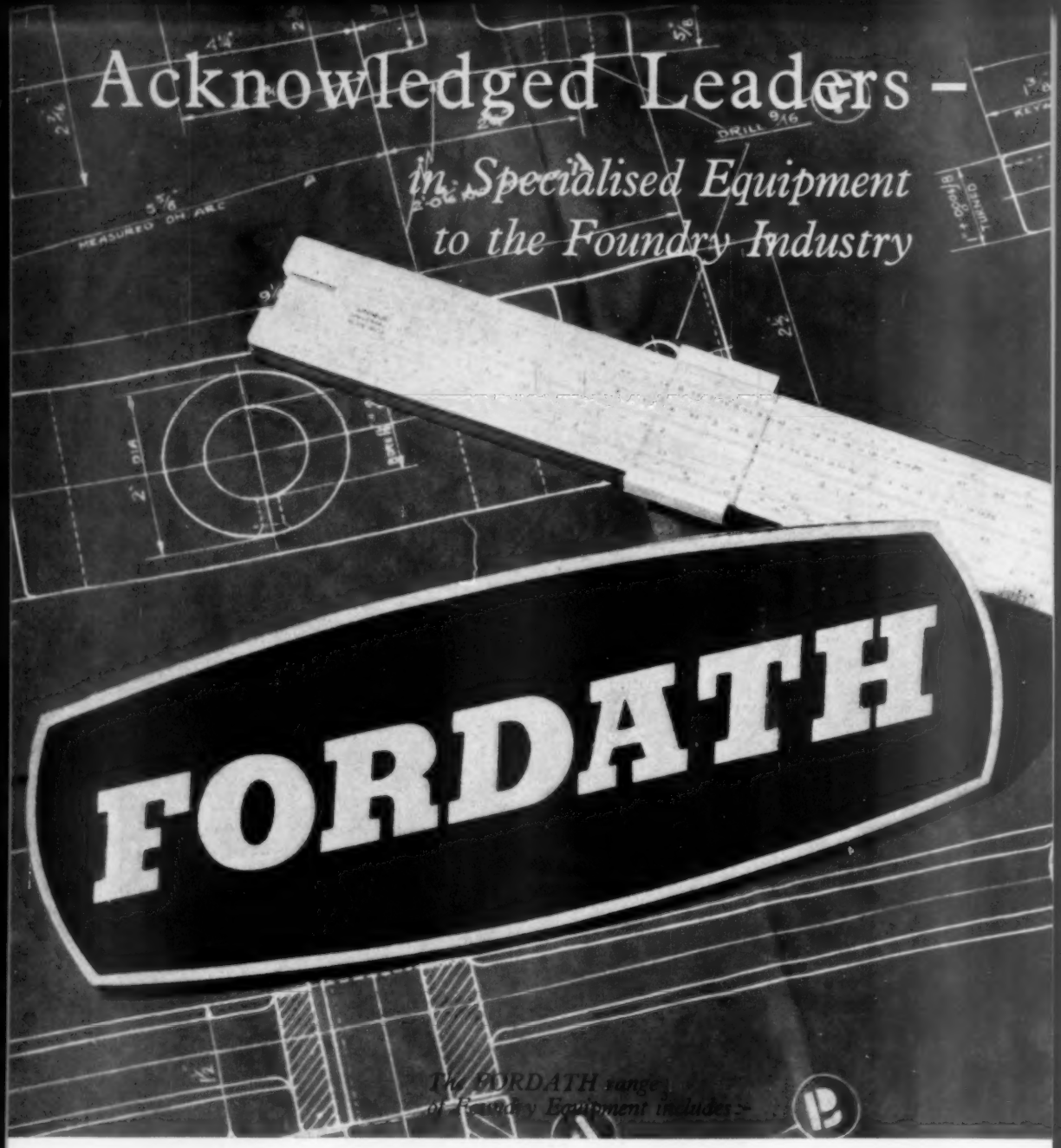
*Patented and Mfd. by Off. Mecc. FRITZ HANSBERG Modena, Italy.*

H5A, H12A, H25A, H80, 17-260lbs. Automatic Oil-pneumatic

50 Years

1911 - 1961

THE CARBORUNDUM COMPANY LTD
MILL LANE RAINFORD ST. HELENS
LANCASHIRE
Telephone RAINFORD 571




FORDATH COMPLETE SHELL SAND COATING UNITS
FORDATH SHELL MOULDING UNITS
FORDATH CORE SAND MIXERS
FORDATH CORE EXTRUSION MACHINES
FORDATH ROTARY SAND DRIERS AND COOLERS
CORALL COREBLOWING MACHINES

FORDATH

THE FORDATH ENGINEERING CO. LTD., BRANDON WAY, WEST BROMWICH STAFFS.
Telephone: WESt Bromwich 1665 (4 lines) Telegrams: Fordath Telex West Bromwich Telex No: 33415

FO234/2 *Bastable*

# FOUNDRY TRADE JOURNAL

Vol. 110 January 26, 1961 No. 2303

Established 1902

*Incorporating*

IRON & STEEL TRADES JOURNAL

Published each Thursday

*Annual subscription:* *United Kingdom* 52s.
*Abroad* 60s. *Payable in advance*

*Editorial Director:*
V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

*Editor:*
A. R. PARKES, M.I.B.F.

*Commercial Editor:*
R. M. HOWSE

*Production Manager:*
R. J. LOVELL

*Publisher:* H. J. DWYER
*Circulation Manager:* E. T. GRIFFITHS

*District Representatives:*
G. P. ELLIOTT (Northern Area) 'phone: Altrincham 1334
T. H. SMITH (Scotland) 'phone: Dumbarton 046
D. C. RYALL (Southern Area) 'phone: TRAfalgar 6171

*The FOUNDRY TRADE JOURNAL is the official organ of the British Steel Founders' Association; Association of Bronze & Brass Founders; the Light Metal Founders Association; Foundry Trades' Equipment & Supplies Association and the National Society of Master Patternmakers.*

AN INDUSTRIAL NEWSPAPERS PUBLICATION

*Published by*
INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL) LTD.

*Directors:*
F. BARRINGTON HOOPER, B.A., *Managing*
F. H. HARLEY
JOHN HOOPER
V. C. FAULKNER
E. G. WESTON, *Secretary*

JOHN ADAM HOUSE,
17-19, JOHN ADAM STREET,
ADELPHI, LONDON, W.C.2

*Telephone: Trafalgar* 6171 (*Private Branch Exchange*)
*Telegraphic Address: "Zacatecas, Rand, London."*


# PRINCIPAL CONTENTS


PAGE

## Technical Control in Steel Foundries in North America

*By Clyde B. Jenni*

Survey of the whole field of process control in the American steel-founding industry, from raw materials to quality of product. This second section covers foundry and cleaning-room practices .. .. 101

## Pressure Dying of Moulds by Electricity

An experimental study is made by the author of the relative efficiency of electricity and coke for drying moulds .. .. .. .. .. 107

## Sand . . . and its Relationship to Efficient Production by $CO_2$ and Dry-sand Moulding Processes

*By F. A. Butler* 113

**Contrôle technique dans les fonderies d'acier en Amérique du Nord. Par Clyde B. Jenni.**
Examen de tout le système de contrôle de procédé dans l'industrie américaine de fonderie d'acier, des matières premières jusqu' à la qualité du produit. La seconde partie comprend la fonderie et l'ébarbage. 101

**Séchage de moules sous pression, à l'électricité.**
L'auteur fait une étude expérimentale de l'efficacité relative de l'électricité et du coke, pour le séchage des moules. 107

**Le sable et ses relations avec la production efficace par le procédé au $CO^2$ et par des moules étuvés. Par F. A. Butler.** 113

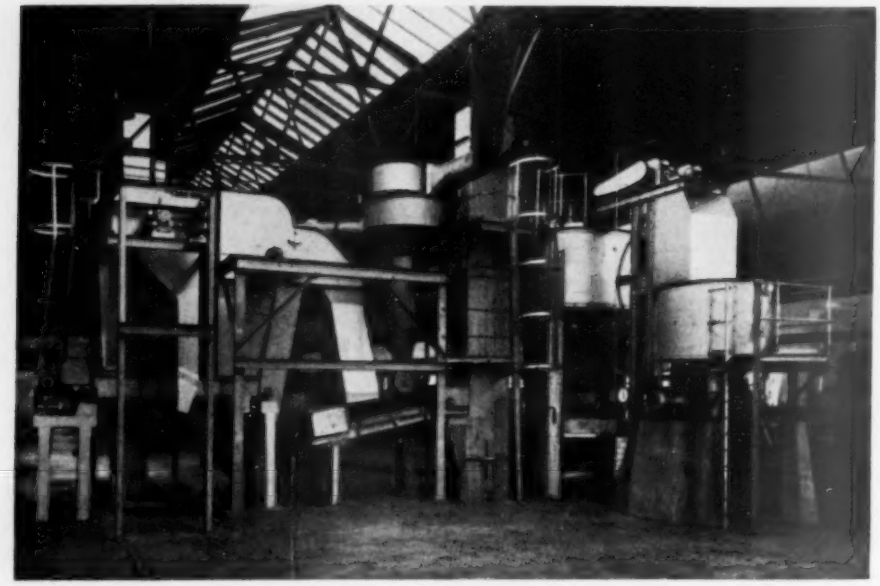
**Technische Überwachung in nordamerikanischen Stahlgiessereien. Von Clyde B. Jenni.**
Eine Übersicht über das Gesamtgebiet der Verfahrensüberwachung in der amerikanischen Stahlgiessereiindustrie, von den Rohstoffen bis zur Güte der Erzeugnisse. Dieser zweite Teil behandelt die Praxis der Giesserei und der Gussputzerei. 101

**Trocknen von Gussformen unter Druck mit Hilfe von Elektrizität.**
Der Verfasser macht eine vergleichende Untersuchung über den relativen Wirkungsgrad von Elektrizität und Koks zur Trocknung von Gussformen. 107

**Formsand und seine Beziehungen zur leistungsfähigen Erzeugung nach dem Kohlensäureerstarrungsverfahren und der Masseformerei. Von F. A. Butler.** 113

*Features, News, Commercial Information and Statistics*

*Leader:* Hallmarking .. .. .. .. .. .. .. .. 99
*Correspondence:* Calculation of Casting Weights .. .. .. .. 100
Light Metals Conference in Austria .. .. .. .. 100
Forthcoming Events .. .. .. .. .. .. .. .. 100
Quality Labels .. .. .. .. .. .. .. .. 112
Art and Craft Exhibition .. .. .. .. .. .. .. 114
Indian Technology .. .. .. .. .. .. .. .. 114
Notes from the Branches .. .. .. .. .. .. .. 115
Instrument Technology .. .. .. .. .. .. .. 116
Tenders for Contracts .. .. .. .. .. .. .. 116
Compulsory Purchase Appeal .. .. .. .. .. .. 116
Fifty-five-year Presentation .. .. .. .. .. .. 116
Equipment and Supplies .. .. .. .. .. .. .. 117
American Letter .. .. .. .. .. .. .. .. 118
Personal .. .. .. .. .. .. .. .. .. 119
Company News .. .. .. .. .. .. .. .. 120
Translation Service .. .. .. .. .. .. .. .. 170
News in Brief .. .. .. .. .. .. .. .. 121
New Patents .. .. .. .. .. .. .. .. 124
British Standards Institution .. .. .. .. .. .. .. 124
Raw Material Markets .. .. .. .. .. .. .. 126
Current Prices of Iron, Steel and Non-ferrous Metals .. .. .. 128
Increases in Capital (advert. section) .. .. .. .. .. 37



*Photograph by courtesy of*
**DUPORT FOUNDRIES LIMITED**

# To solve your SAND COOLING problems-

## THE NEW August's LIMITED Coolevayor

Photograph shows compact sand reconditioning and preparation plant comprising, left to right, elevator, rotary screen and tailing chute, screw conveyor,

**COOLEVAYOR AND CYCLONE UNIT,**

elevator, storage hopper with rotary table feeder to bucket loader to 1½ F size Mix-Muller and aerator.

*Sole Licensees and Manufacturers for the British Empire (excluding Canada, Australia and New Zealand) of the Simpson Sand Mixer.*

**AUGUST'S LIMITED · HALIFAX · ENGLAND**

*Telephone : Halifax 61245/6/7/8* *Telegrams : August, Halifax*

FOUNDRY
TRADE JOURNAL

Vol. 110 January 26, 1961 No. 2303

# Hallmarking

Quality labels had their origin in the middle ages, when the craft guilds took strong steps to ensure that the products of the industries for which they were responsible were of certain standard—hallmarked silver is a typical example. From that time onwards there have been established a number of organizations which have issued quality standards for products. More recently there came into being a system of giving a quality label to authorized firms, such as designating certain establishments as A.I.D.-approved for manufacture and inspection release. In France, a quality label system has been applied to actual foundries, and the European Committee of Foundry Associations has asked the various other countries to ascertain and report whether such a scheme might, if desired, be introduced into their own foundry industry. The result of a survey in this country shows, as one would expect, mixed opinions. Amongst the National and Midland Ironfounders' Association it found no favour, but with other founders operating in specialized fields the scheme met with approbation. The latter obviously represent cases where the actual castings could be "hallmarked," as is the case with the British Standards Institution's Kite-mark, applied in the zinc-base die-casting industry.

Difficulties in "hallmarking" a foundry are obvious. A firm of textile-machinery makers might receive an order for wheels for children's scooters, for which meticulous care in manufacture is not an essential, but the economic return is satisfactory or, again, there may be a need to cater for the buyer who purchases on price only—and usually gets what he pays for.

The best feature of the investigation sponsored by the European Committee was set out in its circular,* which listed the principal points to which foundry inspectors in France direct their attention. It is perfectly obvious that these would serve equally well for use by the chief executive of any foundry to satisfy himself that his shops are operating under controlled conditions to produce castings of standard quality. The *Bulletin* published by the *Centre Technique des Industries de la Fonderie* carries on the back page a humorous article, the contents of which no doubt reflect the conditions of some uncontrolled foundries. A typical example referred to is of a foundry where the pyrometers were out of commission. Nearer at home, there have been cases where statistical control has ceased to function when the man responsible for its conduct took his annual vacation. By having the precepts set out in this appendix constantly in mind, the whole conduct of a foundry can be kept constantly under review. As to the hallmark scheme, if some sections of the foundry industry decide to institute such a system, then a suitable body must be found to award the "quality label"—not an easy problem to solve. Nevertheless, we consider the major objective of a scheme to be the enhancement of the status of the foundry both among casting consumers and in relation to competing industries. In this aspect the idea has our full support and no effort should be spared to devise workable details.

* See page 112 of this issue.

# Correspondence

*To the Editor of the* FOUNDRY TRADE JOURNAL

## CALCULATION OF CASTING WEIGHTS

SIR,—I would like to congratulate Mr. Callaghan on his excellent article on the "Calculation of Casting Weights" which appeared in the December 29, 1960, issue of the FOUNDRY TRADE JOURNAL.

There is just one point which I query. To quote from page 818, column one: "When dealing with annular castings (Fig. 6), these are divided up for ease of calculation into rings (Fig. 7). The quickest formula to use in annular work is derived from Guldinus' theorem . . .". Being also a teacher of patternmaking and foundry practice, it has been my experience that students find difficulty with Guldinus' theorem, but find the following formula much easier to use:—

$$\text{Weight} = \frac{11}{14}(D + d)(D - d) \times L \times \text{density},$$

where D is outside diameter of the ring, $d$ the inside diameter, and L the length of the ring. This formula is obtained as shown:—

Volume of Ring $= \pi R^2 L - \pi r^2 L$

or, using D:

$$\text{Volume} = \frac{\pi D^2 L}{4} - \frac{\pi d^2 L}{4}$$

$$= \frac{\pi}{4}(D^2 - d^2) \times L.$$

but $\frac{\pi}{4} \frac{3 \cdot 142}{4} = 0 \cdot 7854$

or $\frac{\pi}{4} = \frac{22}{7} \times \frac{1}{4} = \frac{11}{14}$

(Note: use 0·7854 if using logarithms.)

$$\therefore \text{volume} = \frac{11}{14}(D + d)(D - d) \times L \text{ cu. units},$$

$$\text{and weight} = \frac{11}{14}(D + d)(D - d) \times L \times \text{density}.$$

Using this method, the solution to Mr. Callaghan's example (Figs. 6 and 7) is as follows:—

*Top section:* Weight $= 0 \cdot 7854 \times (31 + 24) \times (31 - 24) \times 3 \cdot 75 \times 0 \cdot 31 = 0 \cdot 7854 \times 55 \times 7 \times 3 \cdot 75 \times 0 \cdot 31 = 351 \cdot 6$ lb.

*Centre section:* Weight $= 0 \cdot 7854 \times 78 \times 30 \times 0 \cdot 875 \times 0 \cdot 31 = 498 \cdot 5$ lb.

*Bottom section:* Weight $= 0 \cdot 7854 \times 106 \cdot 5 \times 1 \cdot 5 \times 7 \cdot 625 \times 0 \cdot 31 = 296 \cdot 7$ lb.

The combined section weight is 1146·9 lb.; the weight of fillets (as previously calculated by the author) is 14 + 11 = 25 lb., thus the total weight is 1,172 lb.—Yours, etc.

R. WEBBER.

52, Kennington Avenue,
Bishopston, Bristol, 7.

*Author's Reply:*

Replying to the above, the author of the article wrote thanking Mr. Webber for his comment and arithmetical amendment, and saying that on the subject of mensuration there were many instances where alternative formulae might be used. It was fortunate to have these circumstances, as often a given method might be preferable in certain cases. Personally, he found Guldinus' theorem was easier to work with and to teach. The use of this theorem could not be abandoned, as it was essential when calculating the volume of pipe bends. Use of the theorem was also stipulated in the City & Guilds' syllabus for examinations in patternmaking and foundry practice, Mr. Callaghan concluded.

# Light Metals Conference in Austria

The fourth International Light Metals Conference is being organized by the Montanistische Hochschule, Loeben, in conjunction with the Austrian Light Metal Industry, to take place in Loeben, Austria, from June 20 to 24. The theme of the conference is "Light Metals in Light Construction in Architecture and in Special Fields," and no fewer than 44 technical papers are to be presented. Those of major interest to foundry personnel will be "Influence of Small Amounts of Impurities on the Wearing of Pure Aluminium," by Mr. H. Hug, Neuhausen; "Influence of Alloying Elements on the Cast Structure and Recrystallization Behaviour of Aluminium," by Mr. F. Lihl, Vienna; "Age-hardening of Aluminium Alloys," by Mr. K. Maurer, Leoben; "Recent Results of the Fine-grain Structure Investigation for Light Metals," by Mr. F. Regler, Vienna; "Basic Problems in the Grain Refining of Magnesium Alloys," by Mr. A. Schneider; "Present Position and Future Prospects of the Light Metal Industry in America and Asia," by Mr. R. S. Reynolds, USA, and "Enamelled Aluminium in Building," by Mr. W. Bunk, Wuppertal. At all lectures and discussions simultaneous translations will be given in English, French and German.

Works visits and social events will be included in the programme, the official reception of conference delegates by the Burgomaster of the City of Leoben and Municipal Deputies taking place on the evening of June 21. Details of the conference can be obtained by writing to the Geschäftsstelle der 4. Internationalen Leichtmetalltagung Leoben/Stmk., Montanistische Hoschule, Austria.

# Forthcoming Events

JANUARY 27

**Institute of British Foundrymen**

*Birmingham branch:* Annual banquet/dance at the Botanical Gardens, Edgbaston.

JANUARY 28

**Institute of British Foundrymen**

*Lancashire branch:* Annual dinner/dance at the Grand Hotel, Aytoun Street, Manchester.

FEBRUARY 1

**Lindsey Technical College**

"Fifty Years of Progress in Jobbing and Repetition Foundries in Great Britain from 1910 to 1960," by A. S. Beech, 7 p.m.

**Institution of Production Engineers**

*Nottingham section:* "Lubricants in Manufacturing Processes," by W. G. Medlock, 7 p.m., at the Reform Club, Victoria Street.

**Institute of British Foundrymen**

*North-east Lancashire section:* "Casting Production, Revised, Old and New," by W. Collinge, 7.30 p.m., at the Accrington College of Further Education, Sandy Lane, Accrington.

FEBRUARY 2

**Institution of Production Engineers**

*London section:* "Materials Handling in Production Processes and Stores," by R. G. Winton, 7 p.m., at the Royal Commonwealth Society, Northumberland Avenue, W.C.2.

*Rochester graduate section:* "Manufacture and Application of Ball and Roller Bearings," by T. S. Nisbet, 7.30 p.m., at the Sun Hotel, Chatham.

FEBRUARY 5

**Institute of Metals**

*Oxford local section:* "New Aspects of the Electron Theory of Metals," by V. Heine, 7.15 p.m., at the Cadena Café, Cornmarket Street.

## Latest Foundry Statistics

*Copper-base Castings:* The January *Bulletin* of the British Bureau of Non-Ferrous Metal Statistics discloses that output of bronze and brass castings during November, 1960, was 8,476 tons, a figure well above the average monthly production last year.

# Technical Control in Steel Foundries in North America

*By Clyde B. Jenni*

**In last week's issue of the JOURNAL was published the first section of the exchange paper delivered personally to a conference of the British Steel Castings Research Association by the Author on behalf of the Steel Founders' Society of America. This first section covered the first of the nine main headings under which the Author analyzed this broad subject, and was concerned primarily with the control of steel-making in North America. The following continues the survey with a review of foundry practices and carries this topic into the sphere of fettling and shotblasting procedure. (Publication of the final section of the report will follow shortly.)**

## FOUNDRY PRACTICES

### Raw Materials

With very few exceptions, American steelfounders use silica sand for moulding and coremaking, one foundry uses only zircon sand, and others use zircon sand, olivine, or chamotte in parts of their operations. The characteristics of the base sands, such as composition, shape, size and size distribution are significant in their use and in the casting results achieved, and therefore, form the basis for specifications for the procurement of sand.

Sand is generally purchased on the basis of screen analyses or AFS fineness numbers. In some cases, the clay content and the minimum $SiO_2$ content, or maximum $Fe_2O_3$, CaO, and loss on ignition are specified. The Steel Founders' Society of America has issued a Tentative Specification for Washed and Dried Sand, SFSA Designation 12T-59, which is gaining in favour as a purchase specification. The technical requirements include moisture, sand temperature, AFS clay content, composition limits on $SiO_2$, $Fe_2O_3$, CaO and loss on ignition, screen analysis and distribution limitations for 3-screen or 4-screen sands. The specification also includes reference methods to be used in acceptance testing. A Tentative Specification for Zircon Sand and Flour, SFSA Designation 11T, is also in use. Most foundries perform screen analyses on their purchased sand for acceptance; a few accept the sand on certification by the suppliers. Microscopic examination and fusion, or sinter testing, are done on only a limited scale.

*Binders and Additives.* A wide variety of organic and inorganic materials are used as binders or additives for mould and core-sand mixes. Bentonite, fireclay, cereal, dextrine, and core oils are most commonly used. In addition, resins, quick-setting oils, glutrin, pitch, silica flour, wood flour, iron oxide, $CO_2$ and sodium silicate and Portland cement are used. The basis for evaluating and accepting these materials varies widely among foundries. In some cases, no testing is done, acceptance being on the basis of suppliers' reports; in other cases, periodic checks are made and, in a number of instances, there is a comprehensive use of specifications and acceptance testing. Many of these materials are often checked by use in a standard-test mix, and their properties must fall within prescribed limits, some are judged solely on their performance.

Most foundries use bentonite and in many cases acceptance tests are used. SFSA Tentative Specification for Western Bentonite, SFSA Designation 13-T, is gaining favour. Among the technical requirements in this specification are:—moisture, the pH value, calcium-oxide content, and the liquid limit. The methods for determining these values are included in the specification. Other tests used by some laboratories include fineness, dry-bulk density, and a viscosity test. The SFSA has a Tentative Specification for Gelatinized Cereal Binder, SFSA Designation 10T-57, which is used by many. The technical requirements include moisture content, density, soluble material, the pH value, and ash content. The methods to be used in acceptance testing are found in the specification.

Core oils are often evaluated by use in a standardized-bake test. SFSA Research Report No. 7, "Comparison of Core Oils and Binders, and Development of Acceptance Tests," is useful for conducting either an evaluation of a core oil or binder, or for acceptance testing.

*Sand Mixes.*—Sand control or, more properly, control of the sand mixes used in the steel foundry, is of utmost importance. The quality of the steel castings produced is closely related to the proper formulation of sand mixes and the consistent production of the sand mixes, batch after batch, day after day. Casting quality—as reflected in improved casting surfaces, fewer defects attributable to sand properties, and fewer casting losses—results in improved production costs. The utilization of materials under controlled conditions also results in lower sand-costs.

The responsibility for sand control is frequently in the hands of the sand technologist, who is experienced in sand testing and also has considerable knowledge of the characteristics of sands, binders and additives, and their effects on the properties of sand mixes. Sand control may be the joint responsibility of the sand technologist and the supervisor of the sand-preparation department. In some cases, the foundry planning engineer is responsible for the

FIG. 11.—*Control panel of the automatic sand-preparation and sand-distribution system. The operator at the control panel is able to prepare mixes to exact formulæ and deliver them for use by pushing the correct buttons.*

determination of the sand practice and the formulation of the sand mixes, while the mill operators and the sand laboratory assure the control necessary to obtain consistent results. The sand laboratory is one of the vital centres in the operation of the steel foundry, the work there consisting of:—(*a*) development of sand mixes to produce the desired results for the castings to be made and for the moulding and handling equipment available; (*b*) investigation of new materials, particularly new sands and binders, and (*c*) maintenance of uniform properties or quality control.

Sand control consists of the standardization of the chief elements making up the mix and adequate checking at specific intervals, to assure uniformity of results. The chief elements to be considered in the standardization of the mix are the amounts of each ingredient, the grain size of the sand, and the moisture content. (Control of the preparation of the sand mix will be discussed later.)

The following tests are in general use:—(*a*) moisture; (*b*) permeability; (*c*) green strength—green compressive-strength, green deformation, and (*d*) dry strength—dry compressive-strength, baked tensile-strength. In addition to these tests, some laboratories check the elevated-temperature properties, *viz.*, hot compressive-strength at temperatures up to 1,370 deg. C., shock characteristics, and the retained strength after exposure to elevated temperatures.

Sand laboratories are well equipped to conduct their investigations and for control testing. Their equipment consists of:—balances, sand rammer, hardness tester, permeability meter, moisture tester, strength-testing machine, drying oven, core baking oven, laboratory muller, clay washer, and screen-analysis apparatus. In addition, many laboratories have a pH tester, liquid-limit tester, gas analysis equipment, sinter meter and a sand dilatometer, the latter being used for measuring expansion and contraction, shock characteristics and strength at elevated temperatures. Control limits for the various properties are established by the sand technologist. It is generally agreed that moisture is the most important variable, if moisture is out of control, it is very difficult to maintain control over the other properties. Practices vary in respect of the limits in use, and it is difficult to establish limits *per se* without consideration of the conditions in individual plants. Table 1 shows a suggested range for sand control limits.

TABLE 1.—*Suggested Sand Control Limits.*[*]

| Property. | Range (Plus or minus). |
|---|---|
| Moisture, per cent | 0.2 |
| Green permeability, per cent. | 10 |
| Green-compression, lb per sq. in. | 1 |
| Dry-compression, lb. per sq. in. | 20 |
| Hot-strength, lb. per sq. in. | 20 |
| Grain fineness (AFS No.) | 2 |
| Per cent on each screen | 10 |

The success of a sand-quality control programme depends upon the accuracy of sampling and the frequency of testing. Each property should be tested with sufficient frequency to indicate trends which may be developing and thus permit action to be taken before that property be allowed to go out of control. A number of laboratories plot their results and prepare quality-control charts to indicate their true situation. Table 2 contains a suggested scheme for frequency of testing for a large sand-system, and for a small sand-shop. The actual frequency of testing for most foundries is somewhere between these extremes.

TABLE 2.—*Suggested Frequency of Sand Tests.*[*]

| Property. | Large sand system. | Small shop. |
|---|---|---|
| Moisture | 15 min.† | 4 tests per day† |
| Green compression | 1 hr. | 1 test per day |
| Green deformation | 1 hr. | 1 test per day |
| Dry compression | Once a shift | Once a week |
| Hot properties | Once a day | Once a month‡ |
| Screen and clay | Once a day | Once a week |

† Once or twice a day where automatic sand-tempering is used.
‡ Send out to commercial laboratory if not equipped.

Records of sand preparation and sand tests are kept and used by the foundry management. These vary from a record of materials consumed and the results of laboratory tests, to a careful plotting of results in graph form or on a statistical quality control chart. The latter methods are useful in

[*] Frank S. Brewster. "Practical Moulding-sand Control." *Foundry*, 1954, Nov., 102-107.

developing trends and in keeping up the interest and efficiency of the sand-mill operators.

*Sand Preperation.*—Sand is a major item in the manufacture of steel castings. Large quantities are involved and, as has been noted earlier, the quality of the castings can be affected by the quality of the sand mixes used. Major emphasis of control is, therefore, applied to the proper mixing of moulding and core sands. Control in this sector is achieved by the use of standardized procedures. Every effort must be made to produce a uniform product and this can best be done by following a practice in which every ingredient is weighed or measured, and the operations are on a set-time basis. Much progress has been made in this respect and nearly all foundries weigh their materials. This has been aided by equipment, *e.g.*, load cells, becoming available. In some cases when materials are not weighed they are used on a volume control basis. The mixing cycles vary with the type of equipment and the kind of sand being prepared, *i.e.*, facing sand, back-up sand or core sand. All foundries, however, develop mixing cycles for their practice which give the order of addition of materials to the mill and the time for milling the sand mix. In many cases, a portion of the material is added and milled, then other ingredients are added and further milled. Therefore, control is, in most instances, on the basis of using a standardized sand mix by weighing or measuring the ingredients, and by timing of the mixing cycle.

The application of automation to foundry sand-preparation and distribution results in consistent high level quality control of sand mixes as well as worthwhile savings. With automation, it is possible for an operator, stationed at a control panel, to prepare mixes to exact formulae and deliver them for use by pushing the proper buttons. Eight different ingredients can be prepared. On automatic operation, the operator sets the dials for the sand mix desired and the number of batches needed. Again, by push-button control, he also directs the milled sand to its destination. The system automatically weighs and records the weight of the ingredients needed, and discharges the material into the mill at the proper time; water is added under control of a resistance-type moisture controller, and the mix is milled for a pre-set period of time. Fig. 11 shows the control panel used for this automatic sand-system.

*Washes.*—Mould and core washes are in general use principally to give an improved casting-surface. The fineness and refractoriness of the material serves to minimize metal penetration and to give a good "peel." Silica-flour and zircon-flour washes are generally used and some proprietary mixes contain other refractory materials. Both water-base and alcohol-base washes are used. Many foundries choose to use proprietary mixes, chiefly because of their ease of preparation and their better stability, others prepare their own washes. The chief method in the control of washes is the maintenance of a standard viscosity. This may vary with the type of application, *i.e.*, swabbing, brushing, dipping or spraying, and with the type of wash. The Baumé hydrometer is used to control the wash, the values generally ranging from 40 to 70 deg., the average for swabbing and brushing being about 50 deg., for dipping about 47 deg. and for spraying 42 deg. Further control on washes is in the application and subsequent drying; this becomes a matter of supervision following an established procedure.

### Moulding

A variety of methods and equipment are in use in moulding. These range from pneumatic hand-ramming to travelling sandslingers, and include plain jolt machines, jolt/rollover machines, jolt/squeezer machines, jolt squeezers with pin push-up squeezer machines, stationary sandslingers, diaphragm moulding machines, and shell moulding machines.

Control in the moulding department consists chiefly in devising operating procedures applicable to the type of moulding equipment in use, type of pattern equipment, nature of the casting in size, weight and design, and the character of the sand mix used. This procedure, involving the sequence of operations, timing, etc., is then strictly followed and checked by supervision, consistent

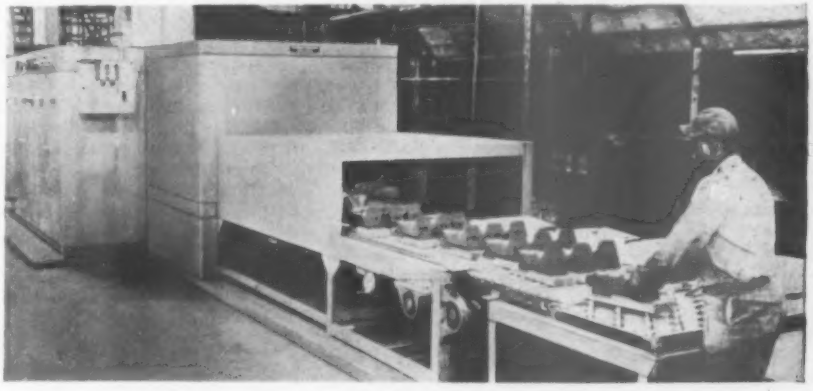


FIG. 12.—*Dielectric drying oven — best adapted for the mass-production of uniform cores —used here for baking resin-bonded cores. Both this and the continuous (tower-type) oven frequently used for oil-sand cores lend themselves to programmed cyclic operation and close control.*

FIG. 13.—*Use of a powder-washing torch for the removal of burnt-on sand in pockets. This equipment can also be used for removing certain defects and for washing-down feeder-stubs and pads.*

results being obtained in this manner. Another control feature, which in most cases is quite valuable, is a planned programme of preventative maintenance for the equipment. Equipment can thus be kept in good working-condition and in proper adjustment and give consistent, efficient operation. Many foundries have regularly scheduled maintenance operations and use a maintenance report form to keep check on this necessary work.

Mould inspection is usually in the hands of a mould inspector, or by supervision. In some cases this is done by a foundry engineer. Gauges are used for checking dimensional-accuracy. The quality of the ramming is judged by measurement of mould hardness. The Dietert mould-hardness tester is widely used. Hardnesses vary, but usually they are in the order of 75 to 80 on squeezer work, 80 to 85 jolt work and 85 to 90 on slinger work, readings in vertical walls are somewhat less.

Drying of moulds varies from no drying in the case of a strictly greensand practice, to oven drying of large dry-sand work. Drying methods include torch drying, air drying, the use of a gas-fired drying hood, of infra-red driers, of forced-air driers (Maxon type) and of drying ovens. Drying cycles vary with the size of the moulds and the degree of drying desired. Some moulds are given a flash drying of 30 sec. to 2 min. duration, while others are given a long drying with programmed rate of temperature rise and holding time. In the case of the latter type of drying, the drying schedule is planned for the individual moulds and a record is maintained by the use of thermocouples and strip-chart recorders. Temperatures used vary from 205 to 370 deg. C. in the shops using dry-sand moulding.

Records maintained in the moulding department vary over a wide range of content. These include:—production reports, or number of moulds produced, moulding schedules, force reports, scrap records, maintenance recorders, pattern-discrepancy reports, drying records, etc. Individual organizations use records which are of importance to the needs of their plant management, accounting, quality control, and foundry supervision.

### Coremaking

Cores are made by hand-ramming methods, and with a wide variety of machines, such as jolt and rollover machines, coreblowers, coreshooters, etc. Cores are made from oil sands, resin binders, quick-setting binders, by the $CO_2$ Process, and by shell moulding. The production of cores by shell moulding is increasing very rapidly. At the recent American Foundrymen's Society Casting Congress and Exposition, many exhibitors showed shell-moulding equipment and examples of shell-moulded cores from many foundries. The programme of the forthcoming SFSA Technical and Operating Conference will comprise discussions on shell-moulded cores. Shell-moulded cores are gaining favour because they make possible closer dimensional-tolerances and the cores offer better collapsibility. The control methods discussed under moulding apply to coremaking practices as well.

Baking is an essential feature of coremaking, and the equipment used includes oil- and gas-fired ovens of car and rack types, drawer-type ovens, continuous ovens (generally of the tower type), and di-electric drying ovens. The tower corebaking oven is used usually for baking cores made in oil-sand and Fig. 12 is a di-electric drying oven which is used for baking resin-bonded cores. Both types lend themselves to programmed cyclic-operation and close control. Drying cycles are programmed by the size and number of cores to be baked. Some organizations use charts which show the relationship between core size and baking time needed. Ovens are equipped with thermocouples and recorders and, in some cases, with automatic controls. Baking temperatures vary with the size of cores and the equipment used, but generally range from 205 to 260 deg. C.

Inspection of cores is generally visual, with some use of the core-hardness tester or scratch tester. Core dimensions are also checked or gauged and, prior to baking, considerable emphasis is placed upon devising proper handling methods, core supports or driers, etc., in order to maintain dimensional accuracy. Completeness of baking is frequently judged by the colour of the core. In many cases, test cubes or extra cores are broken to determine completeness of baking in the interior of the core during the baking cycle. The control of baking of large cores is often aided by embedding a thermocouple in the core and thus obtaining a record of the temperature reached. Other tests include determination of ignition loss and gas analysis, the tensile test is also used in some cases.

### Shakeout

Practices vary considerably regarding the time of shakeout of castings. Small castings may be shaken

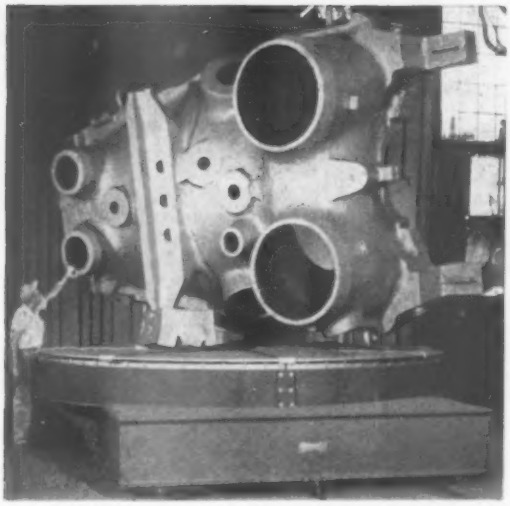


FIG. 14.—*Large steam-turbine casting, blocked-up on a turntable mounted on a car, leaving a shot-blast cleaning room. The time of treatment is automatically controlled by the setting of push buttons.*

out very soon after pouring, whereas large castings may remain in the mould days, and even as much as two weeks. One foundry uses an empirical ration of holding the casting in the mould 24 hr. for every 10,000 lb. of casting weight. Shakeout time and temperature at shakeout are largely influenced by mass and composition. The handling procedure following shakeout is also largely determined by casting design and steel composition. Control is best exercised by determining the best procedure and then insisting that that procedure be followed.

### Sand Reclamation

The reclamation of used foundry sands has attained widespread acceptance in US steel foundries and, according to a recent survey, about two-thirds are using true reclamation methods and of the remainder, many are partially reclaiming these sands by screening, cascade and air separation of dust and fines, etc. Two general reclamation methods are used, dry scrubbing and wet scrubbing. In some instances, a combination of wet scrubbing, classification, de-watering, drying, and dry scrubbing is used. Control of the reclaimed product is generally on the basis of screen analysis and clay content. Many foundries also determine the carbon content or the volatile matter, as determined by loss on ignition. The microscope is often used to check the cleanliness of the reclaimed sand grains. One foundry uses a lightmeter to evaluate their product; this consists of a photo-electric cell which records the intensity of reflected illumination from a constant light source. As the carbon and clay films adhering to the sand grains significantly affect the readings, this instrument can be used to evaluate the efficiency of the reclamation practice. This foundry uses the lightmeter and sieve analysis on a number of samples taken daily.

## CLEANING-ROOM PRACTICES

False impressions are frequently encountered concerning cleaning-room practices, working conditions, the progress (or lack of progress) in improving techniques and control measures. Much progress has been made in this field and the cleaning room need not be the dirty, noisy, disagreeable area that it is so often thought to be. Equipment, methods, and control measures have changed and the progress made in the cleaning room matches that made in other parts of the steel foundry. As indicated above, one of the most effective control measures is to outline the handling procedure, in this case the cleaning-room operations, and then give instructions to adhere to the established procedure. In many cases, one procedure will cover the handling of the casting from shakeout to final inspection, and will include the operations conducted in the cleaning room, removal of defects, preparation for welding, repair welding, heat-treatment, and inspection operations.

Methods of feeder removal vary with size and complexity of feeders and castings and the composition of the steel. These include flogging, especially in the case of necked-down or knock-off feeders, abrasive cut-off wheels, metal sawing, the Arcair torch, and gas burning. Acetylene and oxygen, town gas or natural gas and oxygen, and propane and oxygen are commonly used for burning off heads and gates. Some control is exercised on the use of cutting tips and gas pressures. Much progress has been made in machine burning in order to achieve efficient and economical feeder removal. Hand cleaning methods of chipping with pneumatic chisels and hand grinding are being replaced rapidly by the Arcair torch. This is used for the removal of fins, and of casting defects, preparation for welding, removal of padding, contour dressing, washing down feeder stubs and removal of weld reinforcements. Much chipping and grinding is being eliminated by the Arcair torch. Copper-coated graphite electrodes are used in sizes, ranging from $\frac{1}{4}$ to $\frac{1}{2}$-in. dia. Amperages of from 900 to 1,200 amp. are frequently used with some machines up to 2,000 amp. Powder washing, in which iron powder is carried into the burning torch, is useful for removing burnt-on sand in pockets, for certain defect removal and for washing down feeder stubs and pads (see Fig. 13).

Different types of pressure cleaning equipment are installed, using steel, malleable-iron shot, grit and sand. Facilities include hand cleaning, blasting rooms, and a variety of machines (or cleaning rooms), *e.g.*, Wheelabrator, Tumblast, Rotoblast, Car-type shot blast and Hydroblast units. Fig. 14 shows a large steam-turbine casting, blocked on a turntable mounted on a car, about to leave a shot-blast cleaning room. The time of the entire operation is automatically controlled by the setting of

*American Steelfoundry Control*

push buttons. The turntable slowly revolves, thus exposing fresh surfaces and new angles to the action of the shot, which is thrown with considerable force by centrifugal action from five wheels in a vertical line on the side of the room. The used abrasive falls through a grating in the floor, is cleaned and re-used, and the cleaning operation is thus controlled by the time cycle and excellent results are obtained.

The types of shot or abrasive used vary with equipment and individual cleaning problems. The majority of US foundries have conducted careful investigations to determine the most efficient and economic abrasive for their use. SFSA Tentative Specification for Cast Steel Abrasives, Designation 20T-59, and Tentative Specification for Malleable Iron Abrasives, Designation 21T-59, are commonly used. The materials are designated by shot numbers, which are based on screen size. Technical requirements include composition, screen-analysis hardness values, microstructure, density, and soundness. Sample preparation and acceptance-test methods are included in the specifications. Some companies use brand names and keep performance records on the materials. In all cases, control is used to avoid loss of shot or grit by carry-out in pockets, etc., of the castings.

(*To be continued*)

## Book Review

**Manuel Elémentaire d'Utilisation Pratique des Méthodes Statistiques** (Elementary Manual for the Practical Use of Statistical Methods) (for Engineers and Foundry Technicians) by Jean Gélain. Published by Editions Techniques des Industries de la Fonderie, Avenue Raphael, Paris, pp. 288; price 40 NF (approx. 60s.).

The authors set out to describe as simply and as briefly as possible the principles and concepts of statistical analysis. The book is divided into four parts. The first deals with the laws of probability, theoretical-distribution laws and the adjustment of experimentally observed results to theoretical laws. Part II covers the study of large and small samples, the analysis of variance (the effect of controlled variables on a process) and the planning of experiments. Part III deals with regression and Part IV with the application of statistics to quality control.

The subject of the book is considered by some technologists to be unrealistic and above their mathematical ability. However, the author has presented the topic very clearly and the frequent application of his observations to practical examples maintains the interest and makes the book very readable. No advanced mathematical knowledge is necessary for understanding the methods sufficiently to apply them to metallurgical practice.

The examples given are directly related to foundry practice and are worked out in detail. Amongst the many fields covered are calculations on the distribution of graphite nodules in iron; the porosity of castings; comparison of results from different foundries and different operators; the design of experiments and work on the control of typical foundry processes.

The book is thoroughly to be recommended for technologists in foundries and other metallurgical industries.

P. W. DAVIES.

## Grey-iron Pillar-box

*By C. J. Robb*

The story of the letter-box—or pillar-box as it is as frequently designated—cast in grey iron, commenced in France, for the first one was made to the command of Louis XIV and set up in Paris in 1653. It was due to the combined ideas of Sir Rowland Hill, the " father " of the Penny Post, and one of his surveyors Anthony Trollope—better known as the descriptive novelist of Victorian society and ecclesiastical circles—that the pillar-box came to England. Trollope claimed that he was the actual author of the idea, and his Irish service in isolated rural districts called for the letter-box at the cross-roads. He received authority to erect the first pillar-box at St. Helier in Jersey. Rowland Hill was keen on the idea and Sir Henry Cole encouraged him with his report on Continental letter-boxes made of cast iron.

The first London box was set up at the corner of Fleet Street and Farringdon Street, and the greybeards of the year 1855 denounced this new fangled notion of permitting valuable mail to stand on the thoroughfare unguarded. *Punch* carried some rich cartoons on the subject and the *Times* published anxious letters dealing with this mad innovation. It was claimed that cast iron could be easily broken in a smash-and-grab raid, but this did not happen, and the pillar-box came to stay. By 1860, just a century ago, there were no fewer than 2,000 street and road letter-boxes. By January 1879 there were 12,000, and to-day there are nearly 70,000 in service. Practical jokers posted live mice in the early letter-boxes to destroy the mail as a protest, but it was all to no avail.

### Design

The early pillar-boxes were multi-sided and very ornate in design—some adorned with elaborate garlands of roses and ribbons—when Queen Victoria was still young. Indeed, the Queen insisted on inspecting the designs and added her own whims and fancies to some of them. There were many colour schemes for these wayside mail boxes —blue, brown, green and yellow all being tried. The Queen again objected to this riot of colour for the " Royal Mail," and as the first lady of the land, she would have her way against all odds. Therefore, in 1876, royal scarlet was adopted as the standard colour for the letter-box and has since remained. In 1930 boxes coloured blue were tried for air-mail, but this was soon abandoned as impracticable. Thus did the scarlet-coated grey-iron sentinel become the familiar letter receptacle in our streets, and on our highways and by-ways.

---

WHESSOE, LIMITED, Darlington, have secured a contract worth about £900,000 from Oil India, for the supply and erection, in Upper Assam, of plant required to condition crude oil before it is pumped through the 720-mile pipeline from the Nahorkatiya oilfield to the new refineries at Nunmati and Barauni.

# Pressure Drying of Moulds by Electricity

**The principal methods for drying sand moulds to receive steel and grey iron are described briefly, and measurements are quoted for the efficiency of drying by electrical means. Although the paper deals specifically with one (electric) type of drier, a number of the characteristics are common to mould drying generally, particularly pressure drying.**

In a paper given before the 4th International Congress of Electroheat, held in 1959, Dipl. Ing. W. Annen* took for his subject "Use of Transportable Electric Mould Dryers in Steel and Iron Foundries," and what follows is a substantial abstract of his contribution. At the commencement of his paper, the Author stated that until about 25 years ago, moulds were dried in heat produced from coke, briquettes or charcoal. According to the heat-resisting capabilities of the moulds, the fuel was burned in sheet-steel or wire baskets or direct on the moulds. This method of drying, the Author pointed out, was highly uneconomical because of the high fuel-consumption and the fact that the foundry personnel (particularly crane operators) suffered much discomfort from the fumes. Another disadvantage of this method was that the moulds dried unevenly, and much time was lost in preparing the work and clearing up after the drying process was completed. Hence, in the course of time, this method was gradually abandoned and replaced by ready-made drying units, consisting of a fan and a fuel-fired air-heater of a portable type which could be placed on top of the mould to be dried. At first, the fuel for these units was coke or coal, but later, heavy oil or town's gas was used. Using this type of unit, the heated air, together with the combustion fumes, was directed under slight over-pressure over the surface of the moulds.

## Adoption of Electrical Heating

Turning to the adoption of electrically-heated units, the Author stated that about 20 years ago, in the course of further development, fuel-fired heaters were replaced by electrically-heated units, combined with the use of a fan with considerably higher pressure—up to about 24-in. w.g. This high-pressure fan enabled the method of drying moulds to be altered radically by making it possible not only to take the hot air over the mould surfaces, but to introduce it through the mould sand itself. This necessitated placing the mould to be dried under pressure, which was achieved by closing the mould and applying clay to all joints to form an effective all-round seal. It was therefore necessary, the Author stressed, to distinguish between two fundamentally different drying processes: (A) The use of driers in which hot air is blown into the moulds under slight pressure and flows over the surface only, and (B) the use of driers in which hot air is blown into the moulds under high pressure, and is forced through the mould sand itself. To determine which of these drying methods produced the best results, *i.e.*, which would dry the moulds more quickly and to a greater depth in the most economical way, measurements were made to show the removal of moisture during drying in relation to time and drying depth.

## Experimental Procedure and Results

*Drying Method (A)*

In the experiments carried out and described by the Author, a cast-steel base-mould was chosen, having a surface of 37.5 sq. ft. The composition of the mould was 50 per cent. fireclay (chamotte), grain size 1 to 3; 25 per cent. fireclay (grain size 0 to 1), and 25 per cent. binding clay and water. The gas penetrability of the mould compound after three ramming blows (according to DIN 52401) was GD 500. At the commencement of the drying process, the sand had a water content of 3.6 per cent. by weight, the amount being determined by measuring the electrical conductivity of the mould sand. For this purpose, pairs of electrodes were embedded in the mould at various distances from the mould surface, and the electrical resistance between these electrodes measured. The percentage of moisture relative to the resistance was determined by tests made prior to the experiment described. At the same time, thermocouples were embedded in the sand to enable the temperature to be determined at the electrodes.

A portable coke-fired drier was used for method (A) in which hot air is blown into the mould under slight pressure. Pairs of electrodes were pressed into the mould at distances from the surface of 0.4, 1.4, 2.4, 3.5 and 4.75 in. To simplify the observation of the drying process, the Author assumed that the mould compound consisted of two principal components—sand of various grain-sizes and water, which partially or totally surrounds the individual sand grains as a film of moisture.

Next, the Author described the principles of drying using method (A) as follow: The heat stream passes over the mould surface (Fig. 1), heat conduction from the surface into the body of the mould occurring largely through the freely-moving molecules in the film of moisture. Heating of this film produces steam on the surface as part of the water is converted into steam. This causes an increase in volume and, as there is a simultaneous heat-gradient between the mould surface and the

* The Author is attached to the foundry section of Brown-Boveri, Limited, Baden.

*Pressure Drying of Moulds*

film of moisture, the steam flows towards the mould surface and is carried away by the hot air current passing over that surface. The moisture in the zone immediately beneath the mould surface decreases rapidly as a result of this process up to a distance of 0.4 in. (10 mm.) from the mould surface, where the residual moisture content is one per cent. by weight (Fig. 2(*a*)).

However, the more the film of moisture disappears in the zone immediately beneath the mould surface, the more the heat conductivity diminishes, as a result of the reduction of the number of freely-moving molecules (Fig. 1(*b*)). The greater part of the heat must now be conducted through the sand grains which, in themselves, are an effective heat-insulation. To transfer the heat into the lower layers of sand, the Author continued, it has to be transmitted partly across surfaces adjoining each other and partly across the diminished number of water molecules left between the sand grains. Hence, in order to heat the mould sand, which represents many times the volume of the water content, a manifold increase in the volume of heat was necessary for the same temperature difference. The output of the drier being constant, a longer drying time was needed (Fig. 2(*a*)) at a distance from the mould surface of 0.4 in., where the curve of moisture reduction flattens out in relation to the drying time. The deeper the damp zones, as illustrated in Fig. 1(*b*), the more difficult was the drying process, as can be seen by the curves in Fig. 2(*a*). The Author said that despite the high output of the drier used in the experiment described (of 835,000 BTU's per hr.), 13 hours were needed to reduce the residual moisture content to 0.1 per cent. by weight at a distance of 1.4 in.

TABLE 1.

| Distance from the mould surface. | Residual moisture immediately after drying in per cent.-weight | Residual moisture 24 hours after drying in per cent.-weight. | Increase in per cent.* |
|---|---|---|---|
| 10 mm. (0.4 in.) .. | 0.01 | 0.03 | 200 |
| 35 mm. (1.4 in.) .. | 0.1 | 0.33 | 230 |
| 60 mm. (2.4 in.) .. | 0.33 | 0.66 | 100 |
| 90 mm. (3.5 in.) .. | 0.88 | 1.45 | 65 |
| 120 mm. (4.7 in.) .. | 1.2 | 1.75 | 45 |

* Residual moisture immediately after drying = 100 per cent.

Whilst the temperature rose rapidly in the marginal zone below the mould surface to a depth of 0.12 in. (3 mm.) (Fig. 2(*c*)), it began to rise slowly only after two hours at a depth of 2.2 in. (55 mm.). After 3½ hours, the Author continued, a temperature of 90 deg. C. was reached, which was then not increased even after 13 hours. As a result of the thermal resistance of the dried sand, there was only a small heat-flow which was apparently insufficient to remove the remaining moisture in that area, the Author explained. Sometimes, the mould was left for some time between drying and casting, either for the purpose of inserting large cores or to coat it with a layer of graphite, and during this period, the Author stressed there must be no moisture exchange between the deeper sand areas and the mould surface —known as "strike-back." Completing the experiment with drying method (A), the moisture increase 24 hours after drying was measured and the results are given in Table 1. The specific energy consumption per sq. ft. of surface was

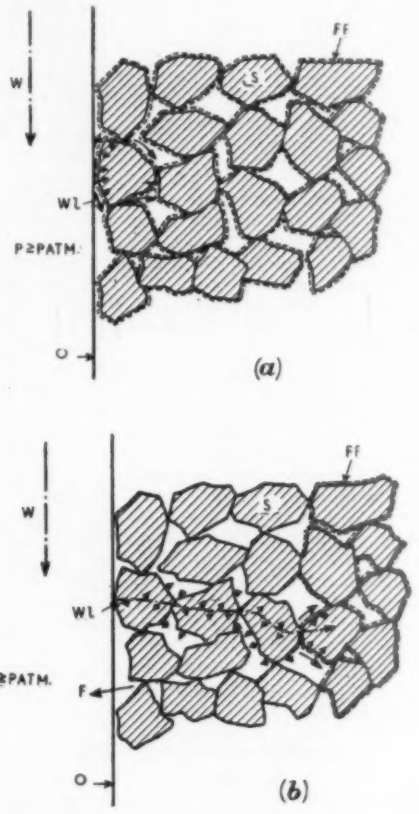


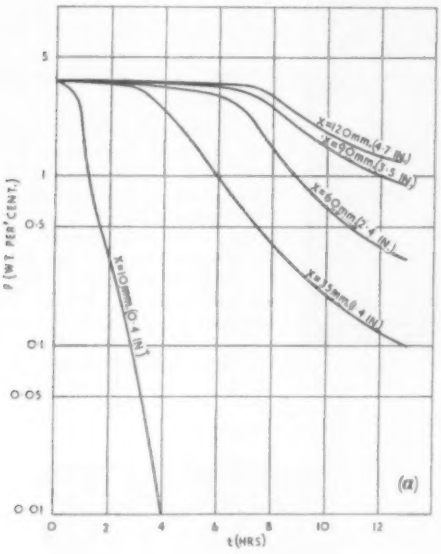

FIG. 1.—*Drying method (A); hot air is blown into the mould at low pressure and penetrates the mould sand. Key:* W *heat flow,* S *sand grain,* Ff *film of moisture,* W1 *heat conduction,* P *pressure of the hot air current in the mould,* Patm *atmospheric pressure,* O *mould surface, and* F *escape of moisture.*

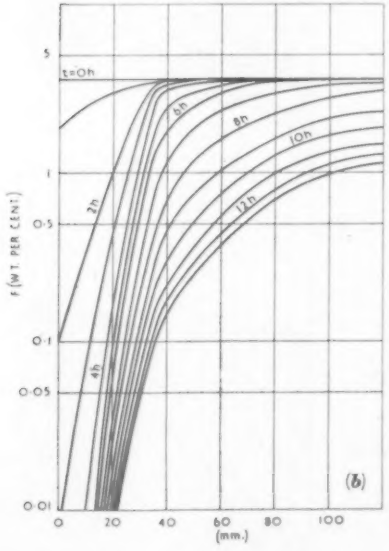
290,000 BTU's. According to claims, the Author stated that better results were obtained with oil or gas driers, but nothing was yet known about the depth of drying.

*Drying Method (B)*

In contrast to drying procedure (A), which the Author stated used only low pressure of around 2-in. w.g., the fan, on the electric mould drier used in the next method, produced high pressure up to

24-in. w.g. The operation of this unit was then described as follows: Cold air drawn-in, is forced through the air-heater and blown into the mould, the funnel riser and casting runner holes on the




surface of which are closed off with plates to make them airtight (Fig. 3). Hot air under pressure causes the heat flow to be forced between the pores of the individual sand grains (Fig. 4(*a*)). Thus, the heat flow not only travels across the freely-moving molecules of the moisture film from one grain of sand to the next, but the heat transfer is also effected by the hot air current.

When using electrically-heated units, the temperature starts to rise immediately in the marginal region to a depth of over 2 in., as is shown by the curves in Fig. 5 (*c*). It was only between the pores of the individual grains, where the hot air current could not reach, that the transfer of heat was effected by the freely-moving molecules of the moisture film. The increased resistance of the dried sand to heat did not affect the heat transfer substantially, as this was effected primarily by the hot air current being forced between the pores of the separate sand grains. In the experiment described, moisture of 0.01 per cent. by weight was found at a depth of 1.4 in., after only two hours, and this with a drier having an output of only 182,500 BTU's per hr. (one-fifth of the output in the experiment carried out on drying method (A)). When using drying method

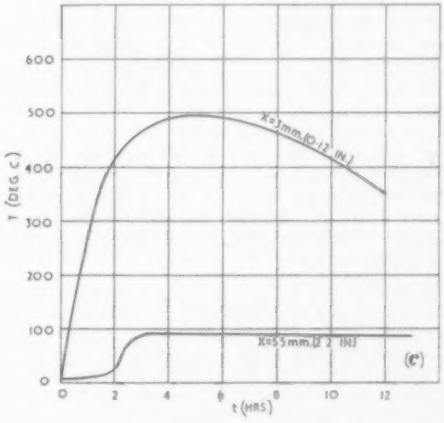



FIG. 2.—*Drying method (A); hot air is blown into the mould as in Fig. 1. Back pressure of hot air in the mould: 1.2-in. w.g.; mould surface 37.5 sq. ft.; output of drier 835,000 BTU's per hr.; F percentage of water content in the mould; x drying depth or smallest distance between the mould surface and the pair of electrodes rammed into the mass, and t drying time in hours. (a) Shows variation of moisture with time at various constant depths. Illustrates clearly low depth-efficiency of moisture removal. (b) Relates moisture to depth at various constant times. Shows poor response to moisture removal even after prolonged heating. (c) By correlating temperature to time at two widely spaced depths this graph reveals the sluggishness of the heat transfer.*

(B), the moisture is taken away at the mould surface and carried to the outside and, although the sand grains in the zone immediately beneath the mould surface were dry (Fig. 5 (*b*)), the heat transfer

FIG. 3 (*alongside*).—*Drying a base mould for steel castings by means of a portable electric mould drier. Risers and runners covered with separate plates and layers of clay are shown, and these separate plates are weighted to counteract the pressure of the heated air inside the mould.*

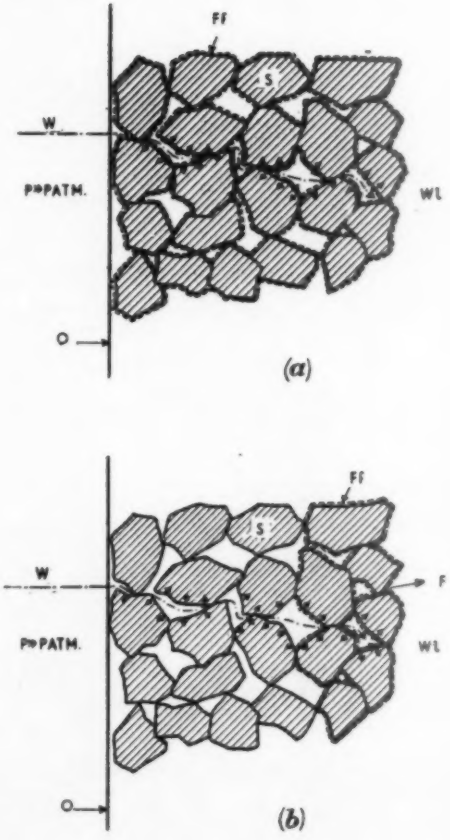
FIG. 4 (*below*).—*Drying method (B); portable electric mould drier, the hot air produced by which is forced under high pressure into the mould and pressed through the mould sand. Key:* W *heat current,* S *sand grains,* Ff *moisture film,* p *pressure of hot air inside the mould,* Patm *atmospheric pressure,* O *mould surface,* F *exit of moisture, and* Wl *heat conduction.*

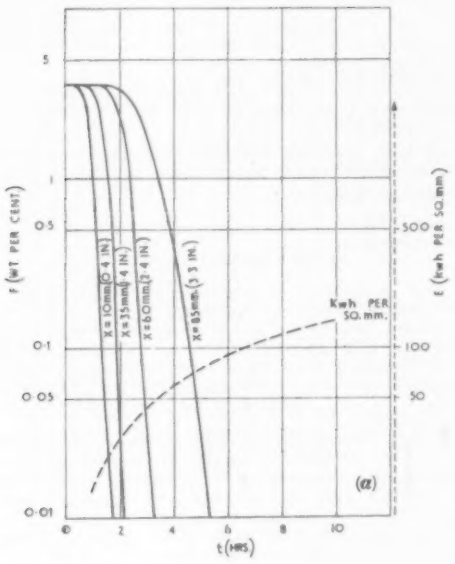
was not appreciably affected, so that the deeper marginal areas were dried in a short time. The Author admitted that the drying process in these parts was slower, partly due to the greater moisture content arising from the steam which had been forced to the rear, and partly to the delay which must occur in the rise of temperature at these points. The decrease in moisture at 3 in. is therefore not as rapid as at 2 in. After four hours' drying time the Author stated that the residual moisture of 0.4 per cent. by weight was measured at a depth of 3.5 in.

According to Fig. 5 (*c*), the temperature at a distance of 2.2 in. from the mould surface rises rapidly at first. The curve flattens out after about one hour's drying time as a result of loss of heat by evaporation. As the moisture at this distance decreases to 0.5 per cent. by weight after about two hours, the temperature in this zone then rises rapidly again. The more the drying process penetrates to greater depths, the more steam is carried to the surface and in the case of moulds bedded into the floor, it was therefore essential, the Author stated, to include steam-removal ducts, and this did not require extra work at the time the mould was made. No special provision was necessary in the case of moulding boxes, as the steam could escape normally through existing holes in the boxes and through the gaps in abutting sections.

As the moisture is deposited in the outer layers and the water content in these parts is increased, it might be assumed that the moisture would return into the mould the more rapidly after the process. As in the case of method (A), with only low pressure, the moisture increase in the mould dried by method (B) was measured after 28 hours, and the content was so small that it could not be registered.

Specific energy consumption per sq. ft. of surface in drying method (B) was given by the Author in the unit described as 7 kwh. or 24,000 BTU's, with a residual moisture content of 0.01 per cent. by





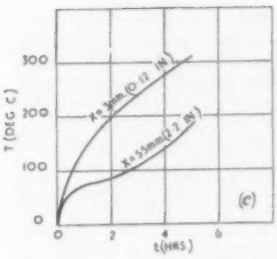
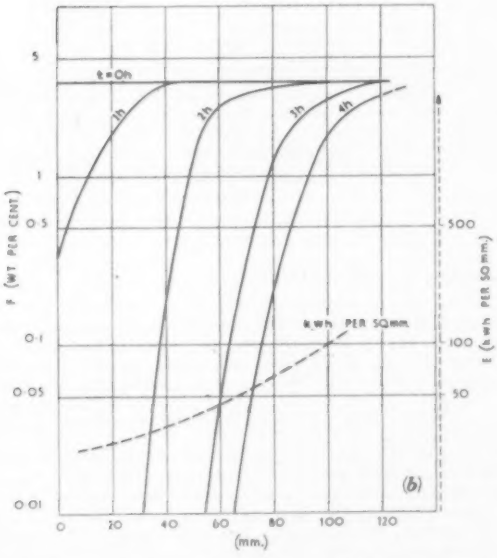




FIG. 5.—*Drying method (B); back pressure of hot air in the mould, 10-in. w.g.; mould surface 3.75 sq. ft.; output of drier 182,500 BTU's per hr.; F percentage of water in the mass of the mould; x drying depth or smallest distance between the mould surface and the pair of electrodes embedded in the mould; t drying time in hours; E energy consumption in kwh. per sq. m. By comparison with Fig. 2 this demonstrates (a) speedier and more uniform moisture removal with time, at various depths, (b) greater time-efficiency of moisture removal at various depths, (c) more uniform and efficient transfer of heat.*




weight at a depth of 3.5 in. If one assumed as sufficient, drying to 0.1 per cent. by weight of water, as was achieved with the coke-fired drier in method (A) at a depth of 2.4 in., then the energy consumption per sq. ft. was 3.5 kwh or 12,000 BTU's. Fig. 5 shows the specific energy consumption figures in kwh. per sq. m. in the form of curves, in (*a*) as a function of the drying time, and in (*b*) as a function of the drying depth.

## Conclusions

Concluding his paper, the Author put forward various advantages he claimed for electrically-heated mould driers and said that apart from enabling fully-automatic temperature regulation, heating the hot air electrically had the added advantage of obviating any traces of steam in the hot air stream which would delay the drying process, as in the case when gaseous, or liquid fuels, were used. It could be concluded, then, he continued, that a portable electric mould drier, working under great pressure, as compared with similar portable drying units with small pressure, took from one-fifth to one-third of the time for drying and consumed one-fifth to one-third of the energy. Even heat-distribution and even drying-depth were guaranteed as a result of the pressure of hot air in the mould, quite independent of the shape of the casting. As a result of this pressure of hot air in the mould, the Author maintained that greater drying depths could be achieved than with drying ovens working without pressure. Also overheating the mould surface was avoided by automatic temperature-regulation and this also obviated the need for supervising the drier. Finally, the Author stated that heating the air in the air heater does not produce additional steam which retards the drying process, and as a last advantage, he claimed that impurities arising from combustion were also eliminated.

---

Mr. E. E. BLAKE, who has been with Kodak, Limited, for more than 50 years, has relinquished his appointment as a director of the company, but will continue to serve as a consultant on matters relating to motion-picture film business. Mr. S. C. SMYTH, financial comptroller since 1952, has relinquished this appointment and will relinquish his appointment as a director on March 31. To fill the vacancies arising on the board, Mr. N. A. BRICK has been appointed a director, with effect from January 1, and Mr. W. F. TAYLOR is to be appointed a director with effect from April 1.

## Quality Labels

A sub-committee of the European Committee of Foundry Associations has been studying the conditions under which quality-label systems might be established in the European foundry industry. The only European foundry industry which appears to have shown any significant interest so far in, or to have established, a quality-label system, is that of France. The scheme there was introduced in 1953; by 1958 it was said that 90 per cent. of the aluminium founders and 25 per cent. of the ironfounders were participating and that the steel and brass founders were beginning to participate. A brief description of the French system is quoted below:

*French System:*

(1) The quality label is an index of the capacity of a particular foundry to produce castings according to an approved mode of manufacture and to an acceptable standard of inspection. It represents approval of the foundry itself, and not of the individual castings—though the latter can be stamped with an appropriate trade-mark to show the user that it has been made by an approved foundry. It is basically a means of raising standards of production.

(2) The scheme is financed by a compulsory levy based on the value of each participating firm's output.

(3) There are seven inspectors covering the whole of France. When he visits a foundry, an inspector examines plant and practice, procedure for control of the manufacturing process, and testing and inspection methods. Samples of raw materials and products are sent to a foundry research association for testing. All the data are gathered into an anonymous report and submitted to a committee of foundrymen, castings users and others who decide whether or not to award a quality label.

(4) Inspection continues on a quarterly basis after the award of the quality label and the latter may be withdrawn if standards are not maintained. These subsequent visits by inspectors are made unheralded.

(5) A foundry awarded the label (and still retaining it) may display a facsimile on its letters, commercial documents, castings, etc.

(6) Amongst the principal points to which the inspectors direct their attention are:—

(*a*) *Manufacturing Process:* Condition of raw material storage; sorting and classification of scrap metal and rejects; dry storage of coke, flux, refractory material and sand; condition of charging platforms; recording and detailing of charge composition; correctness of charge composition and size; condition of furnace; means of controlling melt and frequency of checking temperature; checking of measuring apparatus; condition of ladles; condition of moulding boxes and ovens, and methods of moulding.

(*b*) *Foundry Quality Control Methods:* Inspection of methods (physical, laboratory, records, apparatus) used by the foundry to maintain quality control in respect of raw materials, melts and final product.

(*c*) *Finishing Stages:* The inspector examines the condition of castings in the machine-shop and despatch-bay.

(*d*) *Melt Samples:* Samples of the melt are taken for machining and tensile tests at the foundry research association.

## Steel Output in 1960

Steel production in the UK in 1960 reached a new record level of 24,305,000 tons, an increase of 20 per cent. above the total for 1959 and 12 per cent. above the previous highest annual figure reached in 1957, reports the Iron and Steel Board. Output in December was at an average rate of 451,000 tons a week, 4 per cent. higher than the previous best December figures.

Pig-iron production, at 306,000 tons a week, was also a record for the month of December. Total production for the year at 15,763,000 tons was 25 per cent. above the 1959 total and 10 per cent. above the previous record reached in 1957.

Latest pig-iron and steel output figures (in tons) with the corresponding 1959 returns are shown in the following table:—

| Period. | Pig-iron. | | Steel ingots and castings. | |
|---|---|---|---|---|
| | Weekly average. | Annual rate. | Weekly average. | Annual rate. |
| 1960—October .. | 313,000 | 16,321,000 | 497,000 | 25,842,000 |
| November .. | 315,000 | 16,382,000 | 504,500 | 26,234,000 |
| December .. | 306,000 | 15,912,000 | 451,100 | 23,459,000 |
| Year .. .. | — | 15,763,000 | — | 24,305,000 |
| 1959—October .. | 269,800 | 14,029,000 | 441,400 | 22,953,000 |
| November .. | 277,300 | 14,422,000 | 458,600 | 23,847,000 |
| December .. | 280,400 | 14,583,000 | 432,900 | 22,513,000 |
| Year .. .. | — | 12,582,000 | — | 20,186,000 |

### Export Action Committee

An export medal or plaque to be awarded to factories with exceptional export performances, and export education in all schools, colleges, and universities, are two of the ideas and suggestions put forward for increasing British export consciousness to the "Export Action Now" Committee of the Institute of Directors, which staged its first mass meeting in London recently.

Under the chairmanship of Mr. C. O. Stanley, 800 businessmen, MPs, trade unionists, and advertising and public-relations specialists were asked to send in their ideas. Among the 400 suggestions submitted were:—Women to be canvassed on a national scale for ideas for helping Export Action Now; a national competition for ideas to increase exports; an Export Action Now symbol; an approach to the Postmaster-General to design a stamp focusing attention on British goods for export; and the encouragement of British residents abroad to act as "ambassadors" for British goods and to seek out export opportunities for Britain.

To draw attention to the services which banks can provide for potential exports, a national poster competition with a prize of 500 guineas for the best design will be held.

# Sand . . .

## . . . and its Relationship to Efficient Production by $CO_2$ and Dry-sand Moulding Processes

*By F. A. Butler**

**Satisfaction with plant supplied and practical hints on the operation of both the $CO_2$ and dry-sand moulding processes are reported by a "down-to-earth" foundry manager making a wide range of castings.**

*Carbon-dioxide Process*

With the advent of the $CO_2$ Process, many foundries were and in fact still are confronted with the major problem of obtaining cold dried sand ready for instant use. The following section is intended purely to act as a guide and encouragement to foundry managers who are faced with this problem every day in their own particular foundry.

The writer's foundry, which produces castings for the textile and general-engineering trade by the $CO_2$ Process, was confronted with difficulty in sand drying some eight months ago, resulting in a serious loss of production man/hours per day. At that time there came on to the market a sand-drying and cooling plant, one of which was installed in the foundry. This is an oil-fired unit giving one ton of cold sand per hour using one gallon of fuel-oil, and needs but one man to operate it. It is simple to instal and stands on a level concrete base, no fastening down being necessary. At the present time, the moisture content of the sand arriving at the works is from 10 to 15 per cent.; nevertheless the machine does a wonderful job and gives without fail a supply of cold, dried sand all day long, for instant use.

In considering this question of sand supply, the writer does not accept the idea that it is essential for the sand to be cold and dry for the $CO_2$ Process—although it is beneficial—as from experience moisture can be present in the sand without any danger. Also, if the sand is slightly warm, an addition of one pint of parting spirit per cwt. of sand will overcome the problem of sticking or clagging. Another tip in this direction is to use white-wood pattern equipment coated with parting spirit, or, if the pattern has been varnished, to coat it with a cellulose-base varnish; this invariably assures a good clean draw from the mould. Generally speaking, the introduction of the $CO_2$ Process, properly supervised—with emphasis on sand preparation—is a valuable asset to foundrymen; it gives a casting of a first-class quality at an economical price and in many, many cases the Process can be operated with unskilled labour.

*Dry-sand Process*

When operating the dry-sand process of mould production, it is surprising that so many foundry managers are confronted with the problem of both dummy and rough scabbing, swelling, etc., also the collapse of moulds after drying.

Where a foundry, such as that the Author operates, is producing castings from a few cwt. up to six tons and requiring a high standard of acceptance for the textile and general-engineering trade the preparation and mixing of the sand is most important. Having made a close study of this for many years with a view to producing a mixture of sand reducing to a minimum the dangers quoted earlier, it is contended that these particular problems are no longer evident in the foundry referred to. The following mixture is now in use:

| | |
|---|---|
| 225 lb. (about 15 shovels) of red sand ... | Milled for six minutes. |
| 360 lb. (about 24 shovels) of return sand ... | |
| 20 lb. (about 2 shovels) of spent hops ... | |
| 1 pint of coreoil ... ... ... ... ... | |

The addition of oil has a threefold effect: (*a*) Since the sand has the correct moisture content (8 per cent. max.), a moulder does not need to spray his mould haphazardly from the water brush, as the oil will maintain the sand at a proper texture for mould-finishing purposes after the pattern has been withdrawn; (*b*) it gives an additional hardness to the mould when dried, and most certainly expedites the drying itself; (*c*) when pouring such moulds with metal at a quite high temperature there is no burning-in and the casting leaves the mould clean.

At this foundry drying of moulds is effected by portable driers; for example the time usually taken for moulds for heavy castings of from four to six tons is 2½ hours—or less for smaller items.

*Conclusion*

Many foundry managers and their directors have visited the foundry in connection with their sand problems on both the $CO_2$ and the dry-sand processes and have gone away well pleased with their visit, for this report is based on everyday procedure as applied in the foundry with marked success. The writer is quite sure if foundry managers tackle the sand problem in its initial stage many of the major causes of scrap castings can and will be eliminated.

In conclusion, the Author takes the opportunity of thanking the Editor of the JOURNAL for giving space for printing these practical views and to express appreciation also to the directors of the company, for their encouragement in permitting him to give on-the-spot advice to those who have come along with their own particular problems.

D.

* The Author is foundry manager, P. & C. Garrett, Ltd. of Cleckheaton

## Art and Craft Exhibition

The following details have now been received of the "Foundry Art and Craft Exhibition" organised by the Department of Industrial Metallurgy, Birmingham University, which is to be held in the Great Hall of the University June 20 to 22.

The exhibition is intended for senior schoolboys, college and University students and their respective staff. It is intended to show in the foundry-craft section what foundrymen do, how they do it and the products of their work. The genesis of a casting from blueprint to patterns will be followed by moulding and coring to the final casting method adopted for various types of cast products. In addition, whenever possible, metallurgical and engineering features of founding and foundry products will be used as illustrations. In the art section, examples from earliest recorded types to the present time will be on view. Methods of making art castings will also be shown.

### Exhibition Plan

The Great Hall of the University will be divided into two sections. The central section will deal with the art founding and along the walls in a "U" shape section, various aspects of current foundry craft will be shown.

*Art Section:* The art section will be divided into two parts:—

(1) Historical examples of foundry art and craft and (2) methods of making art castings: (*a*) in sand, (*b*) in plaster, (*c*) as small lost-wax castings, and (*d*) as large lost-wax castings.

*Craft Section:* The craft section will incude:— (1) Patterns (typical examples of type, designs and methods of patternmaking for moulds and cores); (2) moulding materials (foundry sands, binders, dressings, their properties and applications); (3) sand moulding (examples of making sand moulds and cores, design, moulding, coring, gating and feeding of castings); (4) sand founding in various alloys (moulds, cores and castings, metallurgical examples of properties and structure and engineering examples of tests and applications of castings—these sections will include (*a*) Mg alloys, (*b*) Al-alloys, (*c*) Cu-alloys, (*d*) malleable iron, (*e*) grey iron, and (*f*) steel); (5) other sand-moulding methods (these sections will deal with (*a*) $CO_2$, (*b*) shell, (*c*) precision, and (*d*) loam moulding); (6) methods of making castings in the following sections foundry methods other than sand mouldings will be shown:—(*a*) plaster, (*b*) gravity-die, (c) pressure, and (*d*) centrifugal founding), and (7) foundries (models of foundry layout, plant and equipment will be shown in this section, including: equipment for melting, moulding, sand-handling, fettling and examination of castings).

Those requiring further details (or who can put forward art castings or other items for exhibition) are invited to write to the Chief Technician, Department of Industrial Metallurgy, The University, Birmingham, 15.

---

Mr. A. S. BLACK, a director of the General Electric Company, Limited, and area manager for Scotland, has retired after 50 years' service with the company. Mr. Black joined GEC in Glasgow in 1910. He started the branch in Edinburgh in 1919 and in 1937 became area manager for Scotland. He was appointed to the board in 1949. Mr. JOHN S. LANGLANDS, previously assistant area manager for Scotland, has succeeded Mr. Black as area manager.

## Indian Technology

The November issue of the NML *Technical Journal*, published by the National Metallurgical Laboratory, Council of Scientific and Industrial Research, Jamshedpur, India, covers the following subjects:—"Corrosion of Cast-iron Pots used for Fusing Caustic Soda"; "Fabrication and Working of the Vacuum Fusion Apparatus for the Determination of Gases in Metals and Alloys"; "Wear and Friction under Rolling with Slip"; "Direct Evaluation of the Effective Camera Radius in a Debye-Scherrer Photograph," and "Encouragement of Productive Research."

*Caustic Pots*

The conclusions put forward to the article first mentioned are as follow: "The studies carried out indicate that the early deterioration of cast-iron vessels used for caustic-soda fusion, is due to the combined effect of stress and chemical corrosion. The penetration of attack along graphite flakes is probably due to greater porosity of the graphite and the reaction of graphite with caustic soda to form sodium carbonate. The cast-iron pots used for fusing caustic soda are about 3-in. thick and are put to severe service because of the combined action of high corrosion-rate and internal stresses produced, due to low heat-transfer of the material. Thus, the stress produced in the thick-walled crucible due to uneven heat-transfer during heating and cooling, combined with the corrosive action of caustic soda on graphite and iron, causes the premature failure of the crucible.

From the point of view of microstructures of cast iron, it is probable that the distribution of graphite has a great effect on the depth of penetration of attack and so it is quite natural that special attention is given to the casting of the crucible so that premature failure of the cast-iron pots, due to heavy penetration of attack, can be prevented. As far as addition of 0.1 per cent. of either $NaNO_3$ or sulphur to 50 per cent. NaOH is concerned, sulphur will increase the corrosion rate by about three times, while $NaNO_3$ will decrease the corrosion rate to a slight extent for the cast iron of the given composition.

Thus, it may be mentioned that as far as prevention of penetration of attack is concerned from the results of the tests, it is indicated that great care should be taken to heat and cool the crucibles, to avoid any undue rise in stresses. The form in which graphite is present in the matrix is also important and so formation of any coarse graphite flakes should be avoided. Further, it appears that the presence of graphite in nodular form may prevent the penetration of attack to a considerable extent though the exact behaviour of nodular cast iron cannot be stated with certainty without carrying out detailed investigation. From the results of the tests, it is also clear that addition of sulphur should be avoided as it increases the corrosion rate manifold. Sodium nitrate is also considered to possess the property of giving a whiter hydroxide and as such its use will be better from the point of view of resistance to corrosion.

---

### Ford's Second Blast-furnace

Ashmore, Benson, Pease & Company, Limited, of Stockton-on-Tees, one of the companies in the Davy-Ashmore group, has been awarded a contract by Ford Motor Company, Limited, of Dagenham, to construct a new blast-furnace with a hearth diameter of 20 ft. By coincidence this, the fiftieth, furnace contract for Ashmore's comes from the same client who placed the first, 30 years ago. The original unit has a hearth diameter of 18 ft. 3 in. and for several years held every British record for output and economy. The new plant is planned to go into production in 1962.

# Notes from the Branches

## *Lancashire*

In presenting his paper entitled "Safety Devices in a Mechanized Foundry" to the Lancashire branch meeting of the Institute of British Foundrymen on January 16, Mr. H. Pinchin, foundry manager of the Erewash Foundry of Stanton Ironworks Company, Limited, stressed the importance of including a visual means of ascertaining that safety instructions were adhered to. He also pointed out that time and money spent on safety equipment or experiments is a sound investment but it was never possible to draw up a balance sheet because no one ever knew the saving represented by the accident which might be prevented. A number of slides were used to illustrate the lecture.

### Discussion

In reply to numerous questions in the discussion following, Mr. Pinchin said that metal was extracted by magnetic separators from sand being fed to 'slingers, but goggles were also worn by men in the ramming area. The locking device of the 'slinger isolator-switch ensured that power was off when the door was open, and visual evidence was thus given that safety precautions had been adhered to. It was the foreman's responsibility to impress on the men concerned the importance of putting tackle not in use in a safe place. When slagging-off at the cupola a sliding protection panel was used; the chargehand would be responsible for keeping the area clear when dropping the bottom of a cupola. If when using a 'slinger a cup was shattered, the broken bits should go down into the sand; the wearing of goggles would prove an effective safety measure in this instance. Asked what would happen to a man who put a trip-switch out of action by hanging a weight on it, Mr. Pinchin said the man would be subjected to the strictest possible disciplinary action; such foolhardly acts could never be condoned. In reply to another question as to what was the largest ladle used, and would bottom-pouring be an improvement, he said the largest ladle used in his section of the Stanton works was of six tons capacity; he had no experience of bottom pouring, and it would be difficult to apply in that foundry. As to the precautions taken when cupolas were under repair—two charging systems were used, one with a chute and the other a drop-bottom skip. When patching was in progress, the chute had a steel cover placed in position, and the drop-bottom skip was prevented from discharging either by a gate across the opening or a plate covering the cupola shaft.

## *Natal Section*

The Regional Editor for one of the (SA) National newspapers, Mr. G. J. Claasen, was the speaker at the second annual dinner of the Natal section, held in Durban during December. He told his listeners that the Government would do all in their power to assist industry during the coming year and industrialists present were invited to approach the speaker with specific problems which he would be pleased to present to appropriate Government officials.

The retiring president, Mr. J. Robertson, was presented with his past-president's certificate by the incoming president, Mr. G. Mc. L. Thomson. In presenting the certificate, Mr. Thomson congratulated Mr. Robertson on his successful year of presidency, and reminded listeners that he had also been chairman for the provisional year, so that he was truly the "father" of the section. Mr. Robertson thanked the new president for his kind remarks and paid particular tribute to the work of the first section secretary, Mr. John Richmond and to Mr. J. R. Walton who had taken over this job at very short notice. He also thanked the section council members, the branch president, Mr. Gordon Jones, and secretary, Mr. John Steele for their assistance and encouragement during his year of office.

In his presidential address, Mr. Thomson referred to the important work which could be done by the section in Natal and urged members to regularly attend meetings and encourage other qualified foundrymen to complete membership application forms. Referring to the annual report, he stated that membership of the section now totalled 49, made up of 16 members, 27 associate members, three associates and three subscribing firms. Although this showed a loss of five over the past year, it was felt that 1960 had been a year of consolidation and 1961 would reflect an increase, as new applications were already coming in. He reported that during the past year several papers had been presented to the section and there had also been two works visits and a highly successful social evening. New officers for his presidential year were Mr. A. Mitchell, senior vice-president; Mr. F. V. Rice, junior vice-president, and Mr. J. R. Walton, hon. secretary.

Mr. D. Gordon Jones, branch president, brought greetings from Johannesburg and said his council were highly satisfied with the year's working of the section and assured members of the continued support of the South African branch.

The branch secretary, Mr. John Steele, congratulated the foundry industry in Natal on its achievements in meeting the needs of the country's sugar industry in addition to catering for a wide variety of shipbuilding and repair requirements. Presidents of kindred technical bodies in Natal who were present also conveyed greetings from their members.

## *South Africa*

Final function in 1960 of the South African branch was a dance in November at the Airways Recreation Club, Kempton Park, under the chairmanship of Mr. K. H. Coombs, branch president. Over 80 couples enjoyed the entertainment provided.

---

THE SECRETARY of the Beds. and Herts. section of the London branch of the Institute of British Foundrymen announces that March 3 has proved an inconvenient date for the annual dinner. Accordingly Friday, March 10, has been substituted and details will be circulated shortly.

---

Mrs. C. HURST, wife of the deputy chairman of Samuel Osborn & Company, Limited, Sheffield, presented nearly 100 awards at the annual dinner of the firm's sports and social club at the Cutlers' Hall, Sheffield, on January 13. Mr. H. Smith, of the firm, won the individual prize in the Sheffield and District Works Sports Association angling match, and with colleagues, Mr. W. Whittaker, Mr. L. Shaw and Mr. J. Hart, took the team prize also.

C. & J. HAMPTON, LIMITED, tool manufacturers, Sheffield, have agreed to acquire for cash from Steel Nut & Joseph Hampton, Limited, the whole of the share capital of their subsidiary, Woden Tools, Limited. Under the agreement Woden Tools will retain its identity and its sales and distribution will continue through existing channels. Steel Nut & Joseph Hampton will concentrate productive capacity on bright-drawn steel and high-quality nuts and bolts under the appropriate Woden trade mark.

## Instrument Technology

The Society of Instrument Technology and the Birmingham Productivity Association are holding a one-day conference at the Birmingham College of Technology, Gosta Green, Birmingham, on Wednesday, March 29. This conference is designed to interest the small- to medium-size manufacturer, the objective being to show the various aspects of instrumentation which will increase productivity profitably. The lectures will stress, (*a*) increased productivity using the same labour force; (*b*) consistent quality of products by controlled measurement, and (*c*) reduction of process scrap by in-line inspection, including non-destructive testing.

An instrument exhibition has been arranged in conjunction with the conference, at which instruments which are discussed during the day will be exhibited. At this potential users will be able to discuss their ideas with instrument experts. A detailed programme and other particulars are available from Mr. D. Smith, honorary secretary of the S.I.T. Midland local section, c/o ICI Limited, Metals Division, Kynoch Works, Witton, Birmingham, 6.

### Tenders for Contracts

It was not fitting that contractors should have to depend on the "grapevine" for information as to whether their tenders for contracts had been accepted, Mr. Alastair B. Brown, president of the Scottish Plant Owners Association, said at the annual dinner in Glasgow, on January 12. It would benefit both industry and the country if those asking for tenders and the contractors evolved a formula expediting acceptance of tenders, thereby cutting down the time during which plant might lie idle to await a contingent use.

"I would suggest that the time for acceptance of a tender should be laid down in the contract documents, and that the employing authorities should accept an obligation to inform all tendering contractors of the outcome of their tenders as soon as possible," said Mr. Brown.

## Compulsory Purchase Appeal

An ironfounding firm, whose premises were included in an area for which a compulsory purchase order had been made, "felt it had been shabbily treated," said Mr. Richard Smith at an enquiry at West Bromwich. He was objecting on behalf of T. Masters & Sons (Park Foundry) Company, Limited, to an order for which Ministry confirmation was sought.

He said that in 1953 the firm withdrew an objection to the town's development plan on being given an assurance that it would be left in undisturbed possession for 15 years; in less than seven years that assurance had been broken. If the local authority found itself in some sort of impasse, it should have endeavoured to find an alternative site for his clients at a much earlier stage in the proceedings, he claimed.

Mr. J. Burrell, assistant Town Clerk, referring to the assurance given to the company in 1953, said that events in slum clearance had moved faster than expected as a result of the Minister's urging. The company had been offered a site in Union Street if another order affecting the area was confirmed.

### Award Scheme for Apprentices

"Apprentice of the Year" scheme, inaugurated in 1958 by the British Junior Chambers of Commerce and extended in 1960, is to be extended further this year. In addition to awards of nine months in Australia for the best technical apprentice, six months in West Germany for craft apprentices, and six months in the US for commercial apprentices, the age limit for technical and commercial apprentices is to be raised and subsidiary awards made to all regional winners who attend the national finals. These will probably take the form a short visit to an industrial centre in Europe. Details of the scheme, the closing date for which is March 1, may be obtained from Mr. Peter Rex, Kalamazoo, Limited, Northfield, Birmingham (telephone: Priory 2191).

## Fifty-five-year Presentation

*After 55 years' service at the iron foundry of G. Brown Bros., Limited, Stockton-on-Tees, Mr. W. H. Peacock is retiring. He started with the firm at the age of 13 as an office boy earning 13s. a week and is now foreman engineer. In recognition of his service, management and colleagues recently gathered at the local Tillery Inn for a social evening during which presentations were made to Mr. Peacock. In the accompanying photograph he is seen receiving a gold wristlet watch on behalf of the management, from Mr. W. Summers (right), works manager, and a chiming clock from Mr. D. Ratcliffe (left) on behalf of his colleagues. Also in the picture are (left to right) Mr. P. Harland and Mr. J. Doyle, office manager.*

# Equipment & Supplies

## Plycast Process

The Plycast process developed by Nicolas Herzmark of Paris (represented in the United Kingdom by W. J. Hooker, Limited, 239a, Finchley Road, London, N.W.3) is essentially a precision-casting process, based on the age-old lost-wax method of making castings but somewhat cheaper than some adaptations of the process because ethyl silicate is not used as a binder. In fact, a brochure detailing the process and its applications gives the cost of refractory as $0.18 (1½d.) per lb. for small parts (type-A material) and about double this cost for type-V refractory, used for larger components. Labour time for the dipping is given as 45 sec. per layer or a total of 5 to 6 min. per mould (without drying time between layers). Output is further quoted as 90 moulds (for perhaps 5,000 components) per operator per 8-hr. day.

Wax patterns are first produced in the normal way and mounted as sprays on a central runner/feeder. The assembly then receives about seven layers of refractory applied by successive dipping. The first layer to be applied is the most important, as its fineness ensures good surface on the casting; the total thickness of the coating will be of the order of ¼ in., but can be increased where necessary. The moulds are then cured at a low temperature to allow the wax to run out and be collected for re-use. Baking of the moulds is conducted directly at a temperature of 750 to 850 deg. C. for about an hour to 1½ hours depending on size. Whilst still hot, the mould is poured with the chosen metal, which can range from aluminium to alloy steel. The heaviest casting so far made weighs about 1½ cwt. Shell removal, once the castings have cooled down, takes about 30 seconds, it is stated.

The commercial tolerances claimed for small castings are of the order of ± 0.04 in.; or on special dimensions, one half or one third of that figure. A well-illustrated 16-page brochure has been prepared by the promotors which details the process and stresses the advantages to be gained through its use.

## Saw Sharpener

Addison Tool Company, Limited, 28, Marshalsea Road, London, S.E.1, are now marketing the "Buchador" automatic saw-grinder for dealing with a variety of blades. By fitting attachments to the machine, band-saw and hacksaw blades, straight-edge knives, and wood-cutting bandsaws can also be sharpened, in addition to circular saws. The machine can accommodate metal-cutting circular saws from 2- to 16-in. dia., wood-cutting saws from 2- to 24-in. dia. and bandsaws within the width range ⅞- to 2½-in. Grinding is at the rate of 50 to 80 teeth per min. and the machine is supplied with a set of spanners, a grease-gun and two grinding wheels.

## Multi-point Recorder

Honeywell Controls, Limited, of Greenford, Middlesex, announce a new version of their multi-point electronic-strip-chart recorder to enable alternatives of 2, 3, 4, 6, 8, 10, 12, 16, 20 or 24 points to be measured and recorded on one instrument. Known as the Universal ElectroniK multi-point recorder the firm state that it increases the scope of recording different numbers of variables on the same instrument. Range and compensation can also be altered. Variation is obtained in a matter of seconds, it is claimed, the action consisting of replacing a print wheel-cum-indicator dial which is fixed by a thumb-tight nut; then replacing a shorting plug unit on a special input terminal-board inside the instrument. The range of the instrument can also be changed by slipping in new range resistor-cards, and compensation for different types of measuring unit can be altered by slipping in a new input terminal-board.

## Goggles

Manufactured by the Safety Service Company, Limited, "Itex" House, Wendover Road, Harlesden, London, N.W.10, "Itex" "Flexispecs" have been made to comply with the technical requirements of British Standards No. 2092. The goggles, which weigh only 1 oz., are fitted with replaceable curved shatter-proof lenses, and clear nylon sideshields designed to give all-round visibility. It is claimed that the unbreakable nylon frame will withstand the tough treatment in any industry.

**Air-hardening Core-oil in India**: Foundries in India have been faced with the problem of finding a core oil that would yield rapid-hardening accurate cores comparable in strength and other characteristics with those obtained with imported oils. A product recently developed at the National Chemical Laboratory, Poona, from linseed oil—using a special polymerization technique—would appear to provide an answer to this problem. It is claimed the product has a number of advantages and, it is said, gives castings which shake-out and clean easily, because the bond of the core-oil is destroyed at high temperature after pouring. Baking time for cores made with the new product is given as "shorter than those made with double-boiled linseed-oil," permitting more cores to be cycled through an oven per day.

---

FOUNDRY EQUIPMENT, LIMITED, Leighton Buzzard, announce that on February 1, they will open up their first branch office in the UK at Hartford House, 126 Broad Street, Salford, Lancashire ('phone Pendleton 5271). This office will look after the northern area including Lancashire, Yorkshire (East and West Ridings), Cheshire and Derbyshire. Area matters will be handled by Mr. Ron King, senior sales engineer, who has been with the company for many years and has recently returned from a one-year assignment in Canada and USA.

---

## "Broomwade" Conference

At a conference of distributors held late last year at the High Wycombe works of Broom & Wade, Limited, representatives from 18 countries met the directors and technical experts of the company (altogether the company has distributors in 70 countries). At the meeting, the chairman, Mr. H. Dick Broom, announced that in view of the demand for rotary portable compressors it was probable that the sleeve-valve type would be taken out of production. A new small rotary portable, the WR.85, with diesel or petrol engine would shortly be in production. He also announced the approaching replacement of the vertical double-acting compressors, in the normally lubricated versions, by the new compact V-type, also double-acting. These would be made either as two-stage compressors, or as single-stage for low pressures. The carbon-ring dry-cylinder versions of the vertical double-acting machines would still be kept in production until a similar type in the V-machines became available.

# American Letter

## Research and Grey-iron Castings

Addressing the annual meeting of the Gray Iron Founders' Society, Mr. H. W. Lownie, Jr.* of the Battelle Memorial Institute, reported on US expenditure on research. He said that the American grey-iron foundry industry as a whole was spending on research only a few cents per $100 of sales. (Table 1 gives estimated research expenditures in 1960 by some US foundry groups.)

## Foundry Developments

Mr. Lownie then listed some major recent foundry developments which had originated outside the US as follow:—shell moulds and cores; $CO_2$-hardened moulds and cores; air-set cores; coreshooters, spheroidal-graphite iron; water-cooled cupolas; hot-blast cupolas; injectors for borings; Shaw Process ceramic moulds, and the Parlanti Process permanent moulds. All these materials and processes listed, he said, had been developed in countries outside the US where it was recognized that foundry research was necessary to growth. S.-g. iron he felt deserved special mention in that it raised a question about the ability of the US to exploit a new material. A pertinent question was: "Given a new material or process, would the US grey-iron industry take advantage of it?" Some grey-iron foundries had moved fast to get into the production of s.-g. iron soon after its announcement in 1948, but what had happened to it today?

## More Research Needed

Mr. Lownie then asked his audience to consider the following quotation as it applied to today's situation:

"Possibly no industry in this country will benefit more from research work than the ironfounding trade. In the past, it has occupied anything but a creditable position among the manufacturing industries of the country; very little progress has been made from a scientific point of view, archaic constructions and antiquated methods are tolerated complacently by employers, and in consequence, there is a tremendous amount of leeway to be made good before the foundry can be raised to its proper position amongst the leading industries of the country."

This quotation, Mr. Lownie said, was a portion of an editorial which appeared in the FOUNDRY TRADE JOURNAL in 1920. The author concluded that specific action was needed to consider what to do relative to research on grey-iron castings.

* The full text of Mr. Lownie's address is printed in the December 1960 issue of *Gray Iron News*, published for members of the Society from National City-E 6th Building, Cleveland 14, Ohio, USA.

## AFS 1961 and 1962 Events

The American Foundrymen's Society announces that the 29th International Foundry Congress has been scheduled for Detroit's Cobo Hall in May 1962, to coincide with the 66th AFS Castings Congress and Exposition. At this event, the AFS will be host to the entire International Association of Foundry Technical Committees, comprising technical groups in 22 countries around the world. To permit maximum concentration on the 1962 event, the Society has announced cancellation of a limited exposition originally scheduled to be held at San Francisco next May. Instead, the Society will stage, at that time and place, its 65th technical Castings Congress, stated to be one of the largest technical symposia on foundry practice ever held. Requirements of aircraft and missiles manufacturers will play a prominent part at this Congress in San Francisco, the first to be held by the AFS on the West Coast. Of the more than 80 papers already committed, many deal with technical advancements in the die-casting and light metals fields, but the entire range of cast metals will be covered, including steel, grey iron, ductile iron, brass and bronze and malleable iron.

## "Pigs" no Longer

The Aluminium Company of America recently released a 12-page brochure entitled "Aluminium Casting Alloy Ingot," which includes data developed through the company's recently-completed quality-control programme. More specifically, the brochure supplants previous literature which contained references to "aluminium pig." "Pig" previously referred to primary-refined aluminium which was poured directly from the smelter pots into moulds of various sizes. When remelted, fluxed, cleaned and purified, it was cast and called ingot which sold at a higher price. Improvement in the primary metal brought it up to ingot quality and simultaneously eliminated the need for the designation "pig." The US light metal industry in general has dropped the "pig" desgination and with it the extra charge for purity of 99.5 per cent. The brochure also contains information on composition, suggested uses, properties and recommended heat-treatments.

---

Dr. G. H. HOUGH has been appointed chief executive (engineering) responsible for all research and development activities at the Manor Road Factory of the de Havilland Aircraft Company, Limited. Dr. Hough, who joined de Havilland in 1951, was one of the original members of the company's air-to-air guided weapon design team. He was initially placed in charge of the groups responsible for the development of missile guidance and fuse systems. In 1957 he was appointed chief systems engineer, becoming assistant chief engineer in the following year; in 1959 he was made chief engineer of all air-to-air guided-weapon work.

TABLE 1.—*Estimated Research Expenditures in 1960 by Some US Foundry Groups. (One dollar is equivalent to about seven shillings.)*

| | No. of companies. | Estimated sales (million dollars). | Estimated research expenditures. | | |
|---|---|---|---|---|---|
| | | | Total (dollars). | Per company per year (dollars). | Per cent of sales. |
| Steel Founders' Society | 126 | 370 | 100,000 | 800 | 0.03 |
| Gray Iron Research Institute | 17 | 250 | 68,000 | 4,000 | 0.03 |
| Malleable R and D Foundation | 6 | 100 | 400,000 | 67,000 | 0.4 |
| American Foundrymen's Society | (4,000) | 6,000 | 50,000 | 10 | None |
| Gray Iron Founders' Society | 400 | 720 | None | None | None |
| Gray Iron Industry | (2,400) | 3,000 | Under 1,000,000 | Under 400 | Under 0.03 |

# Personal

Mr. H. W. T. HAIN has been appointed a director of Braithwaite & Company Engineers, Limited.

Mr. P. M. KENNETT, formerly a field service engineer of Leyland Motors, Limited, has been appointed sales engineer (Western Hemisphere) of the company.

Mr. A. J. R. WALTER has resigned from the board of the Permutit Company, Limited, on reaching retiring age, but will be available in a consultative capacity.

Dr. A. E. W. AUSTEN has been appointed an executive director of C.A.V. Limited. He was appointed chief research engineer in 1946 and chief engineer in 1949.

Mr. E. O. CHARLTON has been appointed manager of the London office of W. H. Allen Sons & Company, Limited, in succession to Mr. F. A. B. ANDREWS, who has retired.

Mr. R. G. KENT has been appointed deputy chairman of George Kent, Limited, in place of the late Mr. T. P. W. NORRIS. Mr. W. A. H. MAY has been appointed assistant managing director.

Mr. LESLIE SMITH, technical director of the flour milling division of Thomas Robinson & Son, Limited, Rochdale, has resigned from the board but will remain with the company in a consultative capacity.

Mr. HUGH J. ARBUTHNOTT has been elected to the board of the North British Locomotive Company, Limited. He has been in the service of the company for several years and is in charge of all production.

Mr. STANLEY H. GOSS has been appointed joint managing director, to act with Mr. L. G. Oxford, of the Firth-Cleveland Instruments Company, Limited, Treforest (Glam), a member of the Firth-Cleveland group.

Mr. L. R. P. PUGH and Mr. H. W. A. WARING have been appointed directors of Guest Keen & Nettlefolds (South Wales), Limited, in place of Mr. THOMAS JOLLY and Mr. C. R. WHEELER who have resigned from the board.

Mr. A. G. CLEGHORN, general manager Blackheath Works, Birmingham, and Mr. W. H. WENTWORTH PING, general sales manager, have been appointed special directors of Firth-Vickers Stainless Steels, Limited.

Mr. R. WALKER, for many years a technical representative for Foundry Services, Limited, in Scotland, has taken up an appointment with the information department of Foseco International, Limited, of Birmingham.

The *Association Technique de Fonderie de Belgique* (the Belgian foundrymen's technical association) has nominated its president, Mr. ROBERT DOAT, as vice-president of the International Committee of Foundry Technical Associations.

Mr. RUSSELL BAILEY has been appointed chairman of Charles Roberts & Company, Limited, and continues as managing director. Mr. DUNCAN BAILEY has resigned the chairmanship after 61 years with the company, 33 as chairman.

Mr. D. D. TEASDALE, secretary and chief accountant of Fawcett, Preston & Company, Limited, of Bromborough, Cheshire, a member of the Metal Industries group, has been appointed general manager of the company and has joined the board.

Three long-service employees of Hadfields, Limited, Sheffield—Mr. H. GREEN, 51 years' service; Mr. L. KEAY, 53 years, and Miss BRADLEY, 42 years—received retirement gifts from Mr. J. F. Squire, general sales manager and a local director, on January 13.

Mr. RONALD W. CREBER has been appointed a director of G. Beaton & Son, Limited, a member of the George Cohen 600 group. He joined Beaton in 1941 and has been in charge of the design department with the additional duties of technical sales manager.

Mr. C. SMITH has been appointed assistant general manager of the ore-mining branch of the United Steel Companies, Limited. He has been succeeded as group manager, underground mines, by Mr. F. HARRISON, previously assistant group manager, underground mines.

Mr. J. E. HARLE has been appointed manager of the engineering foundry of the Carron Company, of Falkirk, and will take up his duties on February 1. Quite recently, Mr. Harle returned to this country after several years attached to Vulcan Foundries, Israel.

Mr. J. F. DOUGLAS, M.SC.(ENG.), A.C.G.I., D.I.C., formerly principal lecturer in the department of mechanical engineering at the Borough Polytechnic, London, S.E.1, has been appointed head of the department in succession to Mr. G. L. H. BIRD, who recently assumed an industrial appointment.

Stanley European Marketing Organization has appointed Mr. JOHN N. C. MOSS as marketing manager for Southern Europe, embracing initially France, Italy and Switzerland. The organization has been set up jointly by Stanley companies in Great Britain, USA and Germany to provide a central marketing organization in Europe for the company's products.

Staff presentation was made recently to Mr. W. E. BALLARD, managing director of Metallisation, Limited, metal-spraying specialists, of Dudley (Worcs), who is retiring soon, but will remain on the board. He will be succeeded by Mr. ERIC BULLEY. Mr. Ballard joined the company in 1923, a year after it was formed. He served as honorary secretary of the Association of Metal Sprayers from 1936 to 1948, and was chairman in 1951.

Mr. R. J. F. HOWARD has been appointed director of marketing of Metal Industries, Limited, a post in which he will be primarily concerned with co-ordination of marketing activities of electrical companies within the group. Mr. Howard was previously a director of Lancashire Dynamo Electronic Products, Limited. He remains a non-executive director of that company and also joins, in a similar capacity, the boards of five other MI subsidiaries: Brookhirst Igranic, Limited, Lancashire Dynamo & Crypto, Limited, Foster Transformers, Limited, J. G. Statter & Company, Limited and Lancashire Dynamo Nevelin, Limited.

A two-weeks' tour of Germany followed by a weekend in Paris was the reward for Mr. L. A. S. HARBOURNE, an area representative of the crucible department of the Morgan Crucible Company, Limited, as winner of a sales target competition organized by the company. Flying from London to Düsseldorf on January 15, Mr. Harbourne toured factories in the Duisberg and Stuttgart areas of Western Germany. During his trip he visited the crucible factory of Fours Rousseau—Creusets Morgan S.A., Argenteuil, near Paris—an associated company of the group. Before he returns to London on February 1, Mr. Harbourne will be joined by his wife in Paris for a weekend holiday. Next year Mr. Harbourne will have completed 30 years with the company. Most of that period he has spent as a technical representative covering the London area. He is a Council member of the Institute of British Foundrymen.

# Company News

## ICI plans £35,000,000 Rights Issue

To finance expansion plans and to replenish working capital, Imperial Chemical Industries, Limited, is to raise between £34,000,000 and £35,000,000 in the form of a rights issue to its ordinary holders on January 20. They are offered one new £1 ordinary share at 55s. for each £20 ordinary stock. Between 12,584,450 and 12,910,000 shares being issued.

The chairman, Mr. S. P. Chambers, said last week that the new money had not been earmarked for any particular project. At the end of last year the board had sanctioned capital schemes costing £51,000,000 and further expansion schemes would probably be approved this year. Although profit margins were lower he had no reason to suppose that 1961 would "in any sense be a bad year." ICI was not dependent upon any one section of industry or any one country and it therefore tended to be less vulnerable to the problems in any particular industry or country.

It was too early to give final profit figures for 1960, but it was estimated that group income, before tax, would be about £88,000,000, compared with £73,100,000 for 1959. This was after charging some £8,500,000 under the ICI profit-sharing scheme, against £7,100,000 the previous year. The directors expect to pay a final dividend of 1s. 6d. per share, making a total of 2s. 9d., against 2s. 3d. for 1959.

---

WM. PARK & COMPANY, LIMITED—Dividend of 16¾ (13⅓) per cent. is recommended for the year ended September 30, 1960, on capital doubled by one-for-two scrip and rights issues. A further one-for-four scrip issue is proposed. Net profit was £259,397 (£99,649), after tax of £278,161 (£133,522).

CHARLES ROBERTS & COMPANY, LIMITED, carriage and wagon builders and financiers, of Wakefield (Yorks)—No interim dividend on the ordinary capital for the year to next March 31, will be paid. When results are available, consideration will be given to paying a dividend in respect of the full period.

GLACIER METAL COMPANY, LIMITED, manufacturers of plain bearings, bearing metals, diecastings, etc., of Wembley (Middx)—Declaring an interim dividend of 5 per cent. for year ending February 28, 1961, directors announce that the rights issue, forecast last year, will be at 12s. 6d. per 5s. ordinary, on a one-for-four basis. It is proposed to raise approximately £450,000 by the issue of the new 750,000 5s. ordinary.

MORGAN CRUCIBLE COMPANY, LIMITED—To complete the reorganization of the group, four new wholly-owned subsidiaries—Morganite Carbon, Limited, Morganite Crucible, Limited, Morganite Electroheat, Limited, and Morganite Research & Development, Limited, have been registered. The new companies, together with Morganite Exports, Limited, will take over the parent companys' trading activities from April 3 next, as outlined at the annual meeting last July.

HARPER ENGINEERING & ELECTRONICS, LIMITED—Group sales in the year ended June 30, 1960, expanded from £2,200,000 to £10,400,000 and the net profit from £115,801 to £635,184. The dividend on the capital increased by acquisitions is at the forecast rate of 80 (30) per cent. Discussions are in progress for the provision of funds to replace a substantial part of bank borrowings, states Sir Stanley Rawson, the chairman. Total bank indebtedness was £1,857,947 compared with £386,156 previously. It is proposed to make a three-for-two scrip issue from the capitalization of £1,010,250 of share premiums.

# Translation Service

From amongst the most recently published lists of translations available from the Iron & Steel Institute (4, Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

BISI 1884 AUTOMATIC CONTROL OF PRODUCTION PROCESSES IN IRON AND STEELWORKS. (Swedish.) Edling, S. *Jernkont. Ann.*, 1959, (8), pp. 457-486. (£8 5s.) A large number of applications are discussed, with particular reference to data processing and various uses of computer control systems. (*JISI* abstract.)

BISI 1906 INFLUENCE OF CARBON AND OXYGEN ON THE BEHAVIOUR OF SOME ACCOMPANYING ELEMENTS IN IRON MELTS UNDER HIGH VACUUM. (German.) Fischer, W. A., and A. Hoffmann. *Arch Eisenhütt.*, 1960, July, pp. 411-17. (£4 10s.) Vaporization processes in iron melts in vacuum. Behaviour of copper, sulphur, phosphorus, arsenic and nitrogen in melts with carbon contents of 0.001 to 3.0 per cent., and oxygen contents of 0.001 to 0.25 per cent. in a high vacuum of $10^{-3}$ to $10^{-5}$ mm. of mercury. Charge weights of 4.5 to 4.9 kg. and melting times up to 7 h. in crucibles of electro-magnesia, electrocorundum and dolomite, in addition to mixtures of calcium-oxide and magnesium-oxide melted in the electric-arc furnace. Discussion of the experimental results with determination of the distribution coefficient k and the vaporization coefficient $\alpha$. (Author's summary.)

BISI 1923 STEEL AND STEEL PRODUCTS FOR NUCLEAR POWER-PLANTS. (German.) Bruhl, F., and L. Schaeben. *VDIZ.*, 1959 Dec. 1, pp. 1645-1649. (£3 15s.) Effects on steel properties of fast neutron irradiation are reviewed, and types of steel used for various reactor components are outlined. (*JISI* abstract.)

BISI 1931 HARDNESS PENETRATION IN COLD ROLLS DURING FLAME-HARDENING. (German.) Rose, A., and L. Rademacher. *Stahl u. Eisen*, 1960, Aug. 18, pp. 1148-60. (£8 5s.) Investigation of the processes during flame hardening of two materials for cold rolls—Steel 1—approx. C 0.85, Cr 2, and V 0.2 per cent., and Steel 2—C 0.85, Mn 1, Cr 0.3, and V 0.1 per cent. Effect of austenization on the transformation behaviour and hardenability of these steels. Thermo-electrical measurement of heating and cooling processes during the flame hardening of test rolls 90, 140 and 240 mm. dia. under various working conditions. Depth hardening in test rolls. Discussion of the hardening results. (Author's summary.)

BISI 1936 ELECTRON MICROSCOPE STUDY OF THE STRUCTURE OF WORK ROLLS FOR COLD ROLLING—III. Ando, T., *et al. Tetsu to Hagané*, 1956, Mar., pp. 306-307. (Translated from a French version—C.D.S.: IT 3016.) (£2.) Electron micrographs are compared for the quenched and two tempered (for 20 and 40 min. after quenching) states. (*JISI* abstract 1957, June, p. 282.)

BISI 1966 INVESTIGATION OF THE BEHAVIOUR OF HYDROGEN IN STEEL. (trans. from *VDEh* U-SB1622.) Kawai, M. *Tetsu to Hagané*, 1950, Dec., pp. 21-5; 1951, Jan., pp. 23-9. (£6.) (German.)

Translations in course of preparation include the following:—

BISI 1897 PRELIMINARY OBSERVATIONS ON THE APPEARANCE OF DEFECT THROUGH OXIDIZATION AT LOW TEMPERATURE OF FRACTURE SURFACES. (Italian.) Spinedi, P., and A. Garbrecht. *Met. Ital.*, 1959, (7), pp. 411-416. (Included in response to requests—List B 47.)

BISI 1986 WAYS OF REDUCING LABOUR CONSUMPTION IN THE FOUNDRY TRADE. (Russian.) Anon. *Lit. Proizv.*, 1959, May, p. 1.

### Translations of German Standards

A list of German DIN standards which have been translated into English may be obtained from: Deutscher Normenausschuss, Berlin W.15, Uhlandstrasse 175. The list is arranged in classified order, including sections on materials testing, pipes, flanges, screws and nuts, cast iron, steel (strips, section, profiles, etc.). There is a key to the DIN numbers.

---

FOURTEEN APPRENTICES of W. & T. Avery, Limited, Smethwick, have received awards under the firm's suggestion scheme.

# News in Brief

MR. R. CRINGLES, a shotblaster, was injured in the foundry of Clyde Alloy Steel Company, Limited, when a steel casting fell on him.

MILLSPAUGH, LIMITED, Sheffield, has secured an order worth £200,000 for the supply of paper-making machinery to the East German Republic.

THE REUNION DINNER of Hadfield's Jubilee Staff Association, held in the works canteen on January 6, was attended by 90 of the total membership of 118.

ALLIED IRONFOUNDERS, LIMITED, report among recent notable installations the supply of 200 Atlanta baths to London's two newest hotels, the Carlton Tower and the Ariel Hotel.

TELEPHONE NUMBER of the River Don, Grimesthorpe, Park, Stevenson Road, and Tinsley Park works in Sheffield of the English Steel Corporation, Limited, is now Sheffield 49071.

IN 12 MONTHS Imperial Chemical Industries, Limited, has paid out £28,524 to 9,000 employees for suggestions for improving production and efficiency. The biggest single payment was £684.

A TEAM FROM GERMANY is reported from Nigeria by Barclays Bank D.C.O. to have arrived in Enugu to carry out a survey on the feasibility of an iron and steel industry in the eastern region.

THE BRITISH INSTITUTE OF MANAGEMENT is holding the first of a series of conferences on "Management in the 60's" on March 7 at the Connaught Rooms, London, W.C.2. Mr. William H. Whyte, of the USA, is to lead the conference.

SKEFKO BALLBEARING COMPANY, LIMITED, Luton, are to build a factory at Shewalton, Irvine. They have acquired a 50-acre site, have an option on another fairly substantial piece of land, and are at present negotiating for another 10-acre site.

"GOLIATH," a giant crane with a span of 210 ft., recently left the East Kilbride factory of J. H. Carruthers & Company, Limited, in two parts, for Dungeness Power Station. The crane, the largest of its kind built by the firm, weighs almost 200 tons in all.

PRODUCTION of Austria's foundry industry last year was well above that of 1959. Output of iron castings rose by 9 per cent., malleable castings by 18.5 per cent., heavy metal castings by 10 per cent., light metal castings by 13 per cent., and steel castings by 26 per cent.

ELECTRICITY IN THE PROSPERITY AND WELFARE OF THE NATION is to be the theme of the thirteenth British Electrical Power Convention, to be held at Eastbourne from June 12 to 15, under the presidency of Sir John Pickles, chairman of the South of Scotland Electricity Board.

THE BRITISH CAST IRON RESEARCH ASSOCIATION, Alvechurch, Birmingham, has issued indices of authors whose work is published in the 1957-1959 issues of their *Bulletin and Abstracts*, together with subjects dealt with. The booklet, Vol. 14, is a most useful work of reference.

NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED, Glasgow, has signed in New Delhi a technical association agreement with the Government of India for the manufacture of electric and diesel locomotives. The agreement is for a period of five years and follows a previous one of a similar nature.

TWO FRENCH MACHINERY MANUFACTURERS—Etablissements Levivier and Etablissements Delattre et Frouard Reunis, S.A.—have set up a joint sales organization in Western Germany. The new company will start with a basic capital of $238,000 under the name of Deutsche Delattre Levivier.

TRAFFIC RECEIPTS of British Railways rose £19,000,000 (4.2 per cent.) last year to £466,000,000. Freight yielded an extra 2.5 per cent. at £316,000,000. Biggest gain in freight was by minerals traffic which yielded £49,000,000, an increase of 9.7 per cent. Coal and coke receipts of £108,700,000 were down by only £160,000.

THE WOMEN'S ADVISORY COUNCIL on Solid Fuel is to appoint a second organizer to the North Eastern Region it was announced on January 12 at the annual meeting of the Region at the Guildford Hotel, Leeds. Since the North Eastern Region was formed five years ago, another 10 have been started and a further two are envisaged.

THE QUALCAST group of companies are exhibiting at the 1961 International Hardware Trades Fair at Olympia from February 6 to 10 on stand B.73, where they will be showing a complete range of mowers for both home and export markets. The group report a very successful appearance for their products at the recent Royal Smithfield Show.

PHILIPS ELECTRICAL, LIMITED, are to take over on a long-term lease extensive new office space in Berkshire House, a new 11-storey building at the junction of High Holborn and Endell Street, which has its own indoor and open-air swimming pools. Five floors of the building are to be used for office staff of Philips Electrical Industries, Limited.

ANOTHER MINIATURE CUPOLA, this time for use at the Accrington Technical College (Lancs), is under construction by apprentices at the works of Newton, Chambers & Company, Limited, Thorncliffe, near Sheffield. After making the first for their own training centre, Thorncliffe apprentices have supplied several for other firms and training centres.

DURING 1960 the Export Credits Guarantee Department insured more export business than ever before—a total of £694,500,000—under its "commercial" insurance scheme. Although the shipments declared for export in the last quarter of the year were £5,000,000 less than in the corresponding period in 1959, the year's figures showed an 8.8 per cent. increase over 1959.

A CONFERENCE on X-ray Analytical Methods is to be held by Research Control Instruments, Limited, in conjunction with the Department of Geology at the University, Manchester, from March 20 to 24. Enquiries and applications should be addressed to the conference secretary at Research & Control Instruments, Limited, 207, King's Cross Road, London, W.C.1.

THE REBUILT LONDON METAL EXCHANGE in Whittington Avenue, London, E.C.3, is to be opened by the Lord Mayor of London on the morning of Tuesday, April 25. The same evening the Rt. Hon. Iain Macleod, M.P., Secretary of State for the Colonies, will be guest of honour at a dinner, to be given by the London Metal Exchange at the Savoy Hotel, to mark the occasion.

POLISH SPACE at the Leipzig Spring Fair opening on March 5 will be increased from about 43,000 sq. ft. in 1960 to about 65,000 sq. ft. Industrial consumer goods, now double the pre-war percentage in Poland's overall exports, will form an important part of the display. Textile machinery will be shown for the first time at the Fair and a Polish "Warsaw" car will be on view.

*News in Brief*

THE FOUNDRY TRADES' EQUIPMENT AND SUPPLIES ASSOCIATION is holding its annual dinner at the Savoy Hotel, Strand, London, W.C.2 on Friday 24, commencing 7 for 7.30 p.m. Mr. W. E. Aske will preside. Members wishing to attend are requested to make application for tickets for themselves and male guests to the secretaries of FTE&SA, 94/98 Petty France, London, S.W.1 as soon as possible.

REFRIGERATORS for about 37,000 Sheffield housing estate tenants are envisaged in a plan approved in principle by Sheffield City Housing Management Committee. The refrigerators would be installed by the authority and charged at a rental of 2s. 6d. a week, and capital expenditure involved is about £900,000. The refrigerators will be electric, of three cu. ft. capacity. The scheme is expected to take three years to complete.

IZONS & COMPANY, LIMITED, ironfounders, enamellers, etc., of West Bromwich, announce that their oval casseroles, entrée dishes and tricorn stand, designed by John and Sylvia Reid, were recently awarded a silver medal at the "Triennale" in Milan. The Triennale exhibition is one of the largest non-industrial exhibitions in the world and attracts many thousands of people interested in advanced design. Only one other award was made to a British manufacturer.

THE CORROSION GROUP of the Society of Chemical Industry is again holding its competition for the best essay or paper on any aspect of corrosion of metals and its prevention. The prize will be to the value of 25 guineas. Entries, it is suggested, should be about 4,000 words, and competitors should be aged not more than 30 on the closing date, March 31. Further information may be obtained from the corrosion group of the Society at 17, Belgrave Square, London, S.W.1.

TRAINEES FROM INDIA are due to arrive at the Wednesbury steel firm of F. H. Lloyd & Company, Limited, in about three weeks time, it was announced by Mr. F. N. Lloyd, managing director at the firm's New Year welfare party. He said the Indians needed experience to enable them to start their own steel foundry in India. Mr. Lloyd also stated that the parent company had taken over its next-door neighbours, E. C. & J. Keay, Limited, because Lloyds needed the extra ground for expansion.

FORD-WERKE A.G., of Cologne, a company almost wholly-owned by the Ford Motor Company of Dearborn, Mich., plans to establish a manufacturing subsidiary near Genk, close to the Netherlands border. The Belgian Minister for Economic Co-ordination has stated that many other German companies have contacted the authorities in Brussels on investment possibilities in Belgium. The Minister called for enactment of a Belgian/German double-taxation agreement.

THE MACHINE-TOOL manufacturing firm of Hugh Smith (Glasgow), Limited, are to supply what is believed to be the largest type of plate-bending and flanging machine in the world for a new shipyard being built near Gothenburg, Sweden. It is a hydraulically-operating machine, weighing 340 tons, designed to exert a pressure of 2,000 tons to bend steel plates 1¼-in. thick and 48-ft. long. The order, worth £100,000, was gained in face of stiff German competition.

LEEDS EDUCATION COMMITTEE, it is stated, has decided to accept the offer of the Leeds Association of Engineers to provide a plaque commemorating the connection of a new comprehensive school, to be opened at Brown Lane, Holbeck, with Matthew Murray, who is known as "The Father of Leeds Engineering." The school is to be called the Matthew Murray Comprehensive School. Matthew Murray lived from 1765 to 1826 and was a pioneer of locomotives and inventor of mechanical devices.

A DEVELOPMENT SCHEME which will provide work for another 1,400 men at the Lincolnshire port of Immingham is being launched by the Humber Graving Dock and Engineering Company, Limited, assisted by the Grimsby Rural Council. The recent opening of the £2,250,000 graving dock has led to such an increase in shipping using the port that vessels are queuing for berths, and others have to be turned away because of lack of labour. Another £500,000 is to be spent on machinery and equipment for the new graving dock.

GUMMERS, LIMITED, brassfounders, Rotherham, held a celebration dinner on January 16 when presentations were made to long-service employees, among whom was Mr. Henry Parkin, aged 80, who has 65 years' service and has never lost a week's work through illness. Others to receive awards were 65-year-old Mr. Jack Morgan, with 51 years' service, and 80-year-old Mr. Percy Pratt, who retired in 1959 with 62 years' service. Mr. George Gummer, formerly chairman and managing director, said it was hoped to start an "Over 25" Club.

## *Obituary*

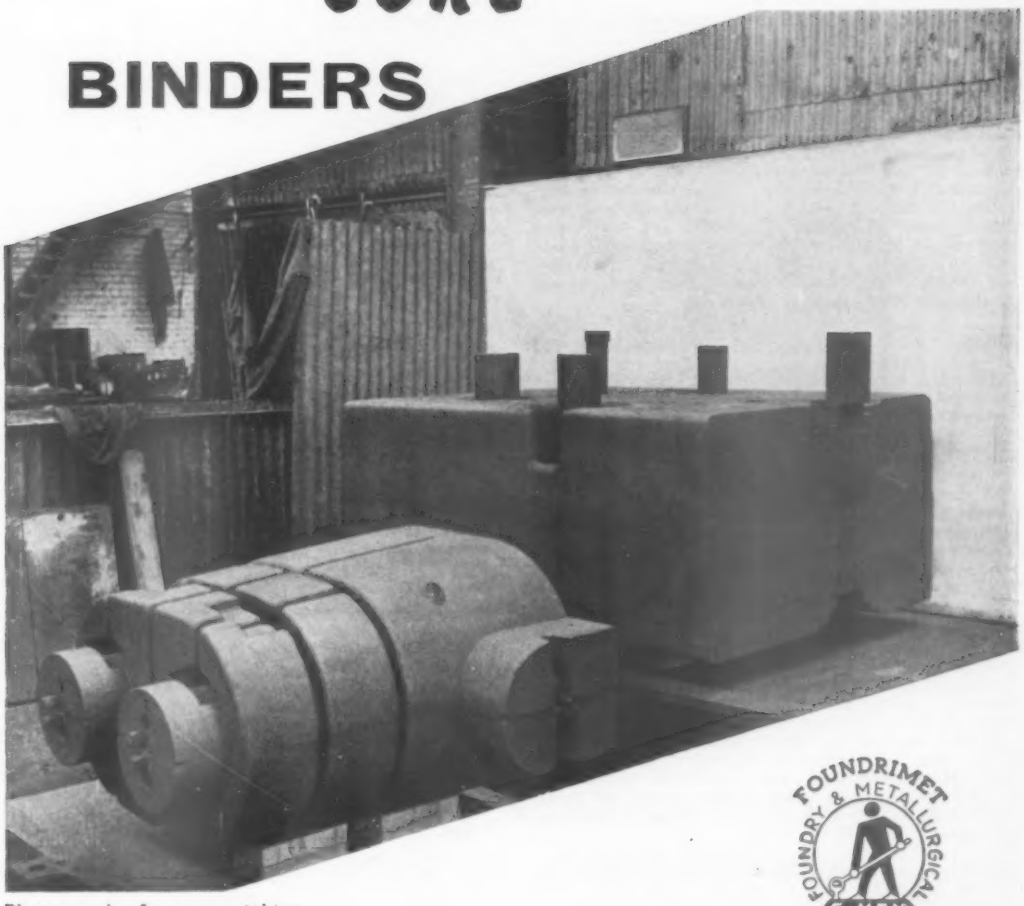
Commander J. R. PATTERSON, technical secretary Pametrada marine-turbine research station at Wallsend-on-Tyne, has died at the age of 58.

The death has occurred at the age of 56 of Mr. HARRY HAWKINS, proprietor of the Irwell Brass Works, Ashton Road, Denton (Lancs). He was foreman moulder with Turner Atherton, Limited, Denton, before taking over the Irwell foundry in 1945. The business is being carried on by his son.

The death occurred on Sunday of Mr. W. J. DAWSON, metallurgical director of Hadfields, Limited, Sheffield, from 1919-1947. During the war he was chairman of the Technical Advisory Committee of the Ministry of Supply's Special Alloy Steels Committee. He was awarded the E. J. Fox Gold Medal of the Institute of British Foundrymen in 1940, and the Bessemer Gold Medal of the Iron and Steel Institute in 1948 in recognition of his contributions to the development of steel castings and to the production of alloy- and heat-resisting steels. He was 81.

Mr. ALFRED AUGSTEIN died last Tuesday in a London hospital at the age of 62. He was a native of Bohemia, now forming part of Czechoslovakia, and in that country built up, with his brother John, a prosperous business as manufacturers of foundry supplies and equipment. He came to this country in 1939 and soon after the outbreak of war became manager in London with F. & M. Supplies, Limited. In 1945, relinquishing his interest in F. & M. Supplies, he became consultant and licensor to Harborough Construction Company, Limited, in Leicestershire. Following a short period in Czechoslovakia, he returned to this country in 1948 and founded, again with his brother, the London firm of Foundry Suppliers, Limited. Mr. Augstein became a naturalized British subject and was extremely successful in integrating himself with the traditional British way of life. During his association with the foundry industry, and as a member of the London branch of the Institute of British Foundrymen (which he joined in 1939) he made a host of friends.

# SUPINOL *CORE* BINDERS



Photograph of cores weighing approx. 35 cwts by courtesy of Seagers Ltd. Dartford.

FOUNDRIMET FOUNDRY & METALLURGICAL F.&M.S.L.

Manufactured by

## F. & M. SUPPLIES LIMITED

4. BROAD STREET PLACE LONDON E.C.2.

TELEPHONE: LONDON WALL 7222 (4 lines)

FACTORY: CONCORDIA WORKS, LONDON, E.14.

Prompt deliveries from stocks in

GLASGOW · MANCHESTER · SHEFFIELD · BIRMINGHAM & LONDON

# New Patents

*(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)*

**828,190.** Enn Vallak, 26 Avenue Krieg, Geneva, Switzerland.

Sinking head-boxes or "hot-tops" for moulds for casting steel or other metals of the kind claimed in B.P. 731,324, and improved in B.P. 753,789 (JOURNAL, July 21, 1955, and October 4, 1956, respectively). It has now been found to be important in making the casting to start combustion of the sinking head-box rapidly so as to immediately raise the temperature to a high value in order that as small an amount of metal as possible shall have time to adhere to the surface of the sinking head-box by solidification.

According to the inventor this is effected by providing the entire or part of the internal surface of the sinking head-box, facing the interior of the mould, with one or more layers of exothermic material which will burn rapidly while developing a high temperature and which thus will contribute to the ignition and combustion of the sinking head-box.

**828,558.** R. W. Taccone, 28 Chautauqua Boulevard, Erie, Penn., USA.

Foundry equipment for making hollow articles, particularly hollow cores for use in casting pipe sections.

**829,077.** General Motors Corporation, Grand Boulevard, Detroit, Michigan, USA.

A method and apparatus for stripping tubular-mould members from the interior of tubular-metal parts. This invention should have particular application in the manufacture of cast bearings, wherein an inner tubular-mould member forms, with an outer backing shell, a mould for the cast bearing liner.

**829,156.** Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7.

A process for providing an exothermic layer in a hot-top, riser or the like, on a mould for the production of a casting or ingot. In the desired position a mass of loose granules or powder of an exothermic material is located. When ignited this will sinter to a mass of substantial strength. The mass of granules or powder is held in position by means of a covered sheet which at the temperature of the molten metal will become disintegrated, burnt or otherwise destroyed.

**829,223.** Die Casting Machine Tools, Limited, and A. R. Mills, both of River Works, 152, Green Lane, Palmers Green, London, N.13.

Improvements in die-casting machines having a fixed die and a movable die. A casting holder is provided adapted to be moved between a first position between the fixed and movable dies when the latter are apart (in which first position the casting holder can receive a casting ejected from the movable die), and a second position adjacent to a punch tool arranged on operation to remove the flash, sprue and runners from the casting in the casting holder.

**829,274.** Union Carbide Corporation, 30 East 42nd Street, New York, USA.

Process for the desulphurization of a ferrous melt. Comminuted calcium carbide is introduced into a stream of carrier gas which is then injected into the melt. This is followed by the injection of a stream of gas free from calcium carbide.

**829,282.** Birmidal Developments, Limited, Woodgate Works, Clapgate Lane, Birmingham, 32.

Apparatus for substantially overcoming the difficulty of ramming, and eliminating the cracks which often occur with shell moulds which have narrow internal passages which change direction.

**829,658.** Union Carbide Corporation, 30 East 42nd Street, New York, USA.

The addition of a nodulizing agent to cast iron in particular—although this Patent does refer more generally to additives for iron and steel.

**830,122.** Stauffer Chemical Company, 380 Madison Avenue, New York, 17, NY., USA.

Vacuum-casting tcehniques in continuous or semi-continuous processes.

**830,228.** Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7.

It is an objective of this invention to employ (in the formation of castings, ingots, etc.) in addition to an exothermic mixture, a quantity of a specific type of oxygen-donating material located close to, but not distributed within, the exothermic mixture.

This company in B.P. **830,285** aims at reducing to a single lifting operation the application of the hot-top and retaining ring, and to another single operation the removal of these elements.

## British Standards Institution

It is announced by the British Standards Institution that the revised edition of B.S. 1016, "Methods for the analysis and testing of coal and coke," is nearly complete. Parts 1 to 9, 11, 12 and 15 have already been issued and Part 10, dealing with the determination of arsenic in coal and coke, has now been published. In the latest standard two methods are described, a colorimetric method and a modified Gutzeit method using a paper-stain finish. Both these methods, it is stated, have been found to give more reliable results than the original Gutzeit method and the electrolytic method described in B.S. 1016:1942, which they replace, although the paper-stain method has somewhat wider tolerances. Copies of the standard may be obtained from the sales branch of the Institution, 2, Park Street, London, W.1; price 6s. (postage extra to non-subscribers).

## Industrial Vacuum-plant Symposium

A symposium on "User Experience of Large-scale Industrial Vacuum-plant" has been arranged by the Institution of Mechanical Engineers to take place at their headquarters, 1, Birdcage Walk, Westminster, London, S.W.1, on March 1 and 2. The proceedings will commence at 4.30 p.m., on the Wednesday, with the introductory address by Mr. N. A. McNeil, chairman of the Engineering Equipment Users' Association. Amongst papers subject to acceptance by the Council are "Vacuum Equipment for Consumable Electrode Melting of Reactive Metals," by Mr. G. W. Turner and Mr. K. Deutsch; "Industrial Vacuum Melting Plant," by Mr. H. C. Child, Mr. H. H. Scholefield, and Mr. P. M. Gray, and "Vacuum Induction Melting," by Mr. L. S. Taylor. Further details are available from the Institution of Mechanical Engineers at the address quoted.

Mr. H. B. MORRIS has been appointed to the board of Wickman, Limited, Coventry.

# AYLESBURY FOR DUCKS

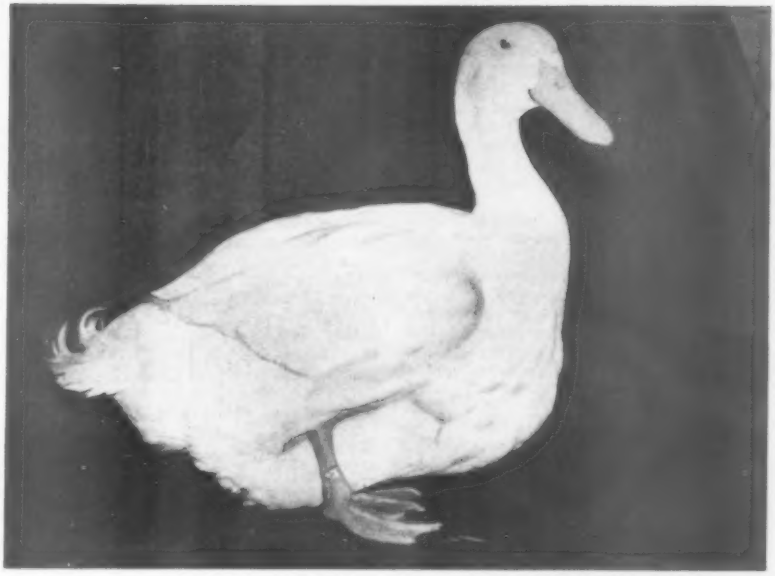


*Photo Poultry-World*

# BALBARDIE FOR VOLCLAY

**the world's finest WYOMING BENTONITE**

**always consistent—always available**

**BALBARDIE LTD., 110 HANOVER STREET, EDINBURGH**

Telephone CALedonian 3755/6/7

•

ALSO AT LONDON, GLASGOW, BIRMINGHAM, LEEDS, MANCHESTER AND NEWCASTLE

•

*Exclusive agents for the American Colloid Company, Chicago, U.S.A.*

# Raw Material Markets

## Iron and Steel

Continued recession in the motor industry is reflected in the reduced output of castings at the foundries which cater for them, and short-time working is in operation at some of these units. With the possibility of a cut in commercial vehicle output, a further decline in demand for castings could result. The engineering and speciality foundries which cater chiefly for the motor industry are the most adversely affected, as their production depends almost entirely on the requirements of this trade. Sections of these foundries which supply to other consumers of high duty castings continue to receive fairly substantial business, including machine-tool makers, power electrical plant manufacturers, agricultural implement makers, steelworks, and other users.

In the light casting industry, the building trades maintain a steady demand and foundries connected with them are able to obtain fairly good outputs. Foundries supplying castings to the domestic utensil industry continue only moderately employed, and they are hoping for some easement on the present credit and hire purchase restrictions on these goods. For some time now their mechanized plants have been only partially employed. The jobbing and textile foundries are reasonably well employed, but could undertake more business.

Supplies of all grades of pig-iron are more than adequate to meet the demands of the foundries for both stock and consumption. The engineering foundries have no difficulty in obtaining low phosphorus irons and hematite, also the refined irons where these are needed. High prosphorus irons are plentiful, and furnaces are anxious to obtain additional orders to enable them to reduce their stocks, and also to absorb a larger quantity from current outputs.

Generally there is little forward buying of pig-iron, apart from some brands of low phosphorus irons and hematite which are limited in production. The foundries are readily accepting all arisings of good quality cast iron and steel scrap, both grades being none too plentiful, while special qualities of scrap are very scarce. Foundry coke deliveries are satisfactory and ganister, limestone and firebricks are readily available.

The re-rollers continue well employed, and although for some of their products, chiefly bright drawn bars and strip for the motor industry, demand has fallen, they have good order-books for small bars and light sections. Reinforcing rods continue in heavy demand. Most of the re-rollers are well provided with mild steel semis, and home steelworks are able to satisfy present demands. The difficulty persists in obtaining the required supplies of carbon and alloy steel billets. All arisings at the steelworks of suitable re-rolling defectives and crops are accepted.

## Non-ferrous Metals

The best thing that can be said for the copper markets on both sides of the Atlantic is that they seem to be settling down. In London the market is quietly steady with consumption in the UK holding satisfactorily and buying developing on the Continent when the London price drops. However, there is no real dealer/consumer interest in the market and the tendency is to wait and see whether the future trend of prices will be up or down.

In the US the market is no better than fair. Prices are more realistic but it is thought that the custom smelter quotation may well be reduced by a further 1 cent to 28 cents a pound as the intake price for scrap is only 22½ cents a pound. The producers, who have now cut-back their output by 10 per cent., are still quoting 29 cents a pound. This reduction in output was announced last week but there is little or no indication that demand has increased. Copper stocks in LME warehouses resumed their upward trend last week with a rise of 375 tons to 15,320 tons.

Tin, which is trying to go better in Singapore, is developing a firmer undertone in London and shows signs of improving in New York where the price is fluctuating around 101½ cents a pound. The firmer undertone in London is due to the action taken by the buffer stock manager last week when he took in metal when the price came within his intervention point of £780 a ton thereby apparently serving notice that he is prepared to put a firm bottom to the tin quotation. The New York market has shown some improvement due to overt signs that the tinplaters are coming back into the market. Tin stocks in LME warehouses gained a further 53 tons last week and now stand at 10,040 tons.

Lead is quiet in London and in New York. Yet at the present depressed price levels there has been some steady buying. One of the chief disappointments is that while the big Canadian producer, Consolidated Mining and Smelting, Limited, announced that it would cut back production by 20 per cent., there have been no reports of anybody else following suit. It may well be, therefore, that the market will have to wait until the next lead-zinc conference in March before similar action on the part of other producers is forthcoming. Meanwhile, the US price is still called at 11 cents a pound.

Zinc is also quietly dull in the main international market centres. Supplies are ample and are being absorbed slowly. In the US, where the price is quoted as 11½ cents a pound for East St. Louis spot metal, steel production is only at 50 per cent. of rated capacity and the automobile industry is reducing production. The outlook continues cheerless.

# House Organs

**Inco-Mond Magazine No. 16.** Issued by the Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

This issue covers a wide range of subjects, including "Safety on the Railways," "Melting Uranium," "Stainless Steel in Architecture," and "Testing the Thickness of Nickel-Chromium Plating."

**Tin and Its Uses No. 50.** Issued by the Tin Research Institute, Fraser Road, Perivale, Greenford, Middlesex.

This issue tells how anti-friction bearings containing 6 per cent. tin, remainder aluminium, are now being made in France from rod which has been continuously cast.There is also an article on the value of employing both zinc and tin together as electroplated coatings upon steel exposed to severe weather conditions.

**Steel Review No. 21.** Published by the British Iron & Steel Federation, Steel House, Tothill Street, London, S.W.1.

The reviewer was personally interested in Mr. Lionel Davidson's article on the history of stainless steel in this issue. Another, by Mr. David King, deals with the annual exodus by motor-coach to the Continent, and a third by Mr. Earl B. Thomas, is about the history of Arthur Lee & Sons, Limited, of Sheffield. The outlook for steel and the changing pattern of management are articles in a more serious vein.

# BIG SHOTS

Baker Perkins offer a complete range of Shot Blasting Machinery covering all requirements.

The range includes Rotating Barrel type machines for bulk handling of small pieces, Rotary Table type machines for continuous production, Swing Table type machines for treating a very wide range of pieces, and Shot Blast Rooms for large-scale operations on fabricated pieces and structural work.

Whatever your need — whether it's plate cleaning, shot peening, descaling, *or any application where you suspect you may be breaking new ground* and would like experienced advice and co-operation — get in touch with Baker Perkins. Why not write for illustrated literature and performance details of the range?

**BAKER PERKINS LTD**
**BEDEWELL DIVISION, HEBBURN-ON-TYNE, CO. DURHAM**

PHONE: JARROW 897124

BP/F12a

# Current Prices of Iron, Steel, and Non-ferrous Metals

*(Basis prices, delivered unless otherwise stated)*

January 25, 1961

## PIG-IRON

**Foundry Iron.**—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

**Low-phosphorus Iron.**—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

**Cylinder and Refined Irons.**—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

**Refined Malleable.**—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

**Hematite.**—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 10s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

**Basic Pig-Iron.**—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

## FERRO-ALLOYS

*(per ton unless otherwise stated, delivered)*

**Ferro-Silicon** (6-ton lots and over).—45 per cent. Si, £43 10s. 0d. to £46 0s. 0d., scale 15s. 0d. per unit, lumpy. 75 per cent. Si, £60 0s. 0d. to £63 10s. 0d., scale 15s. 0d. per unit, lumpy.

**Ferro-vanadium.**—50/60 per cent., 22s. 6d. per lb. of V.

**Ferro-molybdenum.**—65/70 per cent., carbon-free, 12s. 10d per lb. of Mo.

**Ferro-titanium.**—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

**Ferro-tungsten.**—80/85 per cent., 11s. 3d. per lb. of W.

**Tungsten Metal Powder.**—98/99 per cent., 14s. 3d. per lb. of W.

**Ferro-chrome** (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

**Metallic Chromium.**—98/99 per cent., 6s. 10d. per lb.

**Metallic Manganese.**—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

**Ferro-columbium.**—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

**Ferro-manganese** (Standard).—78 per cent., £61 10s. 0d

## SEMI-FINISHED STEEL

**Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft u.t., 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons & over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4s. 0d.

**Billets, Blooms, and Slabs for Forging and for Stamping** (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

*Average 68-70 per cent.

## FINISHED STEEL

**Heavy Plates and Sections** (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

**Small Bars, Sheets, etc.**—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 18s. 0d.

**Alloy Steel Bars.**—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

## NON-FERROUS METALS

**Copper.**—Cash, £218 15s. 0d. to £219 0s. 0d.; three months, £219 5s. 0d. to £219 10s. 0d.; settlement, £219 0s. 0d.

**Copper, Tubes, etc.**—Solid-drawn tubes, 2s. 1¾d. per lb.; rods, 232s. 6d. per cwt. basis; 20 s.w.g., 267s. 6d. per cwt.

**Tin.**—Cash, £781 0s. 0d. to £781 10s. 0d.; three months, £784 10s. 0d. to £785 0s. 0d.; settlement, £781 10s. 0d.

**Lead (Refined Pig).**—Second half January, £63 5s. 0d. to £63 10s. 0d.; second half April, £64 12s. 6d. to £64 15s. 0d.; settlement, £63 10s. 0d.

**Zinc.**—Second half January, £78 12s. 6d. to £78 15s. 0d.; second half April, £78 10s. 0d. to £78 15s. 0d.; settlement £78 15s. 0d.

**Zinc Sheets, etc.**—Sheets, 15g., and thicker, all English destinations, £114 10s. 0d.; rolled zinc (boiler plates), all English destinations, £112 5s. 0d.; zinc oxide (Red Seal) d/d buyers' premises, £95 0s. 0d.

**Brass Tubes, etc.**—Solid-drawn tubes, 1s. 9d. per lb.; sheets to 10 w.g., 190s. 3d. per cwt.; wire, 2s. 7½d.; rolled metal, 190s. 3d. per cwt.

**Brass (Brazing).**—BS1400, B3, £172; B6, £218.

**Brass (High Tensile).**—BS1400, HTB1, £193; HTB2 £208; HTB3, £228.

**Gunmetal.**—BS1400, LG2, £214; LG3, £224; G1, ¼% £286; G1, 1%, £276.

**Phosphor Bronze.**—BS1400, PB1 (AID released), £304; BS1400, 90/10/1, £291.

**Leaded Phosphor Bronze.**—BS1400, LPB1, £236.

**Phosphor Bronze Strip, etc.**—Strip, 276s. 0d. per cwt.; wire, 3s. 11¾d. per lb.; rods, 3s. 2¼d.; tubes, 3s. 2¼d.; chill cast bars, solids 3s. 2d.; cored 3s. 3d. (CHARLES CLIFFORD LIMITED).

**Nickel Silver, etc.**—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 9¾d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 2¾d.; special quality turning rod, 10 per cent., ¼ in. dia., in straight lengths, 4s. 1¾d. All prices are net.

**Other Metals.**—Magnesium, ingots, 2s. 2¼d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £69 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £241; AB2, £249.

## Increases in Capital

DAVY & UNITED INSTRUMENTS, LIMITED, Sheffield, increased by £79,900, in £1 shares, beyond the registered capital of £100.

TUBELS ENGINEERING COMPANY, LIMITED, increased by £19,000, in £1 ordinary shares, beyond the registered capital of £1,000.

B.S.K. (ALUMINIUM), LIMITED, Birmingham, increased by £3,500, in £1 ordinary shares, beyond the registered capital of £3,500.

DOWTY GROUP, LIMITED, Cheltenham, increased by £2,000,000, in 10s. shares, beyond the registered capital of £4,000,000.

PEE-CEE ENGINEERING SUPPLIES, LIMITED, Bristol, increased by £5,000, in £1 ordinary shares, beyond the registered capital of £5,000.

MIDLAND ALUMINIUM, LIMITED, Wolverhampton, increased by £250,000, in 5s. ordinary shares, beyond the registered capital of £575,000.

DUCTILE STEELS, LIMITED, Willenhall (Staffs), increased by £750,000, in 5s. ordinary shares, beyond the registered capital of £750,000.

APPARATUS & INSTRUMENT COMPANY, LIMITED, London, W.C.2, increased by £2,500, in £1 shares, beyond the registered capital of £2,000.

LAWFORD PLANT & MACHINERY, LIMITED, London, W.1, increased by £4,900, in £1 ordinary shares, beyond the registered capital of £100.

CAMCOS (MACHINERY), LIMITED, Letchworth (Herts), increased by £50,000, in £1 ordinary shares, beyond the registered capital of £100,000.

TUBE INVESTMENTS, LIMITED, Birmingham, increased by £18,000,000, in £1 ordinary shares, beyond the registered capital of £27,250,000.

FERNHURST ENGINEERS, LIMITED, Godalming (Surrey), increased by £1,000, in £1 ordinary shares, beyond the registered capital of £1,000.

E.P.C. ENGINEERING COMPANY, LIMITED, Wilford (Notts), increased by £44,000, in £1 ordinary shares, beyond the registered capital of £8,000.

ASSOCIATED TUNNELLING COMPANY, LIMITED, London, S.W.1, increased by £35,000, in £1 ordinary shares, beyond the registered capital of £35,000.

ALBERT MANN ENGINEERING COMPANY, LIMITED, Basildon (Essex), increased by £135,000, in £1 ordinary shares, beyond the registered capital of £15,000.

WEST END WELDING COMPANY, LIMITED, North Shields, increased by £7,500, in £1 unclassified shares, beyond the registered capital of £25,000.

PRESLAND & PARTNERS, LIMITED, engineers, etc., of London, S.W.19, increased by £18,000, in £1 ordinary shares, beyond the registered capital of £2,000.

DAVY & UNITED ENGINEERING COMPANY, LIMITED, engineers, of Sheffield, increased by £2,999,900, in £1 shares, beyond the registered capital of £100.

NICKEL ANODES & NON FERROUS CASTINGS, LIMITED, Birmingham, increased by £100,000, in £1 ordinary shares, beyond the registered capital of £50,000.

HUDSON EVANS (BIRMINGHAM), LIMITED, engineers, etc., of Tamworth (Staffs), increased by £4,000, in £1 ordinary shares, beyond the registered capital of £2,000.

GEORGE WILSON & SONS (HUDDERSFIELD), LIMITED, ironfounders, etc., increased by £10,000, in £1 ordinary shares, beyond the registered capital of £5,000.

BRECKNELL, DOLMAN & ROGERS, LIMITED, ironfounders, etc., of Bristol, increased by £250,000, in 4s. ordinary shares, beyond the registered capital of £250,000.

TIPTON & MORLEY, LIMITED, dairy and agricultural engineers, etc., of Barnard Castle (Co. Durham), increased by £5,000, in £1 shares, beyond the registered capital of £5,000.

CONDER ENGINEERING COMPANY (MIDLANDS), LIMITED, constructional engineers, etc., of Winchester, increased by £20,000, in £1 shares, beyond the registered capital of £20,000.

HATCHETT & COMPANY, LIMITED, constructional and general engineers, etc., of Hyde (Ches), increased by £132,500, in £1 ordinary shares, beyond the registered capital of £85,000.

B. S. PALMER & COMPANY, LIMITED, manufacturers of machines, etc., of Fareham (Hants), increased by £140, in £1 ordinary shares, beyond the registered capital of £100.

REX NICHOLS & COMPANY, LIMITED, nut, bolt, and screw manufacturers, etc., of Birmingham, increased by £5,000, in £1 ordinary shares, beyond the registered capital of £25,000.

HAMER GOODLAD & COMPANY, LIMITED (formerly Aboudico, Limited), iron masters and founders, etc., of Eckington, increased by £9,900, in £1 ordinary shares, beyond the registered capital of £100.

WALMSLEY (BURY) GROUP, LIMITED, manufacturers of pulp and paper making machinery, etc., of Bury (Lancs), increased by £250,000, in £1 ordinary shares, beyond the registered capital of £1,200,000.

RICHARD SUTCLIFFE LIMITED, mining specialists, general engineers, etc., of Wakefield, increased by £117,000, in 112,876 "A" ordinary and 4,124 unclassified shares of £1 each, beyond the registered capital of £383,000.

**PIG IRON,** All Grades
METALLIC ABRASIVES
SHOTBLASTING MACHINERY
FOUNDRY MACHINERY

WILLIAM
JACKS
AND COMPANY LIMITED

HEAD OFFICE
WINCHESTER HOUSE
OLD BROAD STREET
LONDON EC2
LONdon Wall 4774

*And at:*
BIRMINGHAM 2
39 Corporation Street
Midland 3375/6

GLASGOW C2
93 Hope Street
Central 9969

FERRO SILICON 12/14%
ALLOYS & BRIQUETTES
FOUNDRY COKE
LIMESTONE
GANISTER
MOULDING SAND
REFRACTORIES

B

# CLASSIFIED ADVERTISEMENTS

**PREPAID RATES:** **Twenty words for 10/- (minimum charge) and 4d. per word thereafter. Box numbers 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

**Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.**

## SITUATIONS WANTED

FOUNDRY MANAGER, 48, with technical ability and a wide practical knowledge in all aspects of the Foundry trade, technical liaison, estimating, plant layout and purchasing, etc. Willing to travel anywhere. Box FM539, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, having ideal practical, technical and commercial experience, seeks opportunity to control small to medium size jobbing foundry. A time served moulder with good record in management. Cost-conscious and with modern outlook. Personal contacts and selling experience could bring new work. Box FM534, FOUNDRY TRADE JOURNAL.

MANUFACTURER'S AGENT operating in the Midlands with excellent connections amongst all classes of engineering, would be pleased to hear from a Foundry—repetition or jobbing—requiring representation on an agency basis in the Midland counties. Box MA551, FOUNDRY TRADE JOURNAL.

NON-FERROUS Gravity Foundry, Technical Manager, A.M.I.B.F., seeks change. Twenty years' practical experience in all Depts. Would prefer situation in smaller concern with possibility of directorship or partnership, Birmingham area. Box NF559, FOUNDRY TRADE JOURNAL.

PLANT ENGINEER (40) seeks new appointment in modern Mechanised Foundry where special experience in the manufacture and machining of repetition castings is required. Accustomed to full control of Installation, Maintenance and Development. Salary required around £1,750 with housing assistance. Qualifications include A.M.I.Plant.E., A.M.I.B.F. Good background. Box PE568, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE with extensive connection in London & Home Counties with large industrial groups wishes to represent a Foundry for cast iron non ferrous die-castings, etc. Personal connection, commission and expenses. Box TR572, FOUNDRY TRADE JOURNAL.

METALLURGIST, 32, C. & G., H.N.C., desires progressive position with scope for advancement. Sixteen years' experience laboratory, rotary furnaces, cupolas, receivers, fettling, casting, labour, chill'ed and high duty irons, jobbing, mechanised foundries, purchasing, stock control. Present situation full charge melting plant. Present salary £1,200. Box MC570, FOUNDRY TRADE JOURNAL.

OPPORTUNITY for progressive company to engage commonsense executive (35): manager/metallurgist (A.I.M.): grey and malleable iron; technical, practical, commercial; useful contacts. Box OF557, FOUNDRY TRADE JOURNAL.

## SITUATIONS WANTED—*contd.*

FOUNDRY FOREMAN, fully experienced in high quality iron castings. Free end of month. Willing to travel. Box FF571, FOUNDRY TRADE JOURNAL.

## SITUATIONS VACANT

REPRESENTATIVE REQUIRED, preferably man already calling on Foundries in the Midlands and the South. Must be experienced in Foundry practice and techniques, and be able to advise customers on the use of Studs and Chaplets. Good opening for a man with the right experience. Write, giving full details to Box RR542, FOUNDRY TRADE JOURNAL.

**Advertisers** whose announcements appear under a box number are urged to acknowledge, however briefly and informally, all replies received. This particularly applies to advertisements under "Situations Vacant"; serious inconvenience and, sometimes, real hardship can be caused to applicants who receive no indication even of the safe receipt of their communication. Failure to acknowledge replies can also reflect on the good faith of this journal, which is responsible for their onward transmission. If it is desired to maintain anonymity, an acknowledgement on plain paper, quoting the relevant box number, is all that is necessary.

## SITUATIONS VACANT—*contd.*

SENIOR FOREMAN required for large Non-ferrous Foundry in Home Counties, manufacturing wide range of Bronze and Light Alloy Castings. Must have experience in production of heavy Bronze and Gunmetal Castings by machine and floor moulding methods. Good salary. House available. Box SF536, FOUNDRY TRADE JOURNAL.

STEEL FOUNDRY in North of England requires ESTIMATOR, capable of extracting weights from drawings, and knowledge of Methods an advantage. This is a staff appointment. Write stating age, experience and salary required to Box SF554, FOUNDRY TRADE JOURNAL.

IRONFOUNDERS manufacturing Domestic Appliances (Manchester area) offer opportunity to keen young foundryman starting as ASSISTANT to Foundry Foreman for further training to managerial level. Applications, stating age and giving full details of experience to date, should be addressed to Box IM543, FOUNDRY TRADE JOURNAL.

DRAUGHTSMAN ESTIMATOR/PLANNING ENGINEER with experience of Aluminium and Zinc Pressure Die-casting required by progressive Company in North-West London. Permanent monthly staff appointment and Pension Scheme. Substantial salary to a fully-qualified man. Apply in writing, giving details of education, experience, etc., to the PATENT DIE-CASTINGS CO. LTD., 88 Strode Road, London, N.W.10.

# PRODUCTION ENGINEER

*required for Precision Casting Division of*

***FAIREY AVIATION LIMITED at Hayes, Middlesex.***

Applicants should have sound technical education and executive experience in economic manufacture preferably including precision casting. Ability in the development of plant, works layout, tooling facilities and manufacturing and handling methods can be used to make this appointment one with excellent prospects. First-class pension and life-assurance schemes.

Convenient location with easy access to London or country. Apply with concise summary of education, training and experience to the

***Personnel Manager***

**Fairey Aviation Limited, Hayes, Middlesex.**

*(A Division of Westland Aircraft Limited)*

## SITUATIONS VACANT—contd.

SKILLED Aluminium and Bronze MOULDERS required; permanent positions for men with ability. Wide range of interesting work on floor or bench. Good rates of pay, or piecework. Modern foundry situated in Leicestershire. Pension and life insurance scheme operating. Housing assistance can be arranged for suitable applicants. Box SA561, FOUNDRY TRADE JOURNAL.

SKILLED PATTERNMAKER required for medium mechanised foundry, South East coast. Complete knowledge of machine moulding methods, wood and metal production patterns essential. Box SP564, FOUNDRY TRADE JOURNAL.

THE BRITISH STEEL CASTINGS RESEARCH ASSOCIATION

has vacancies for

**Two Senior Investigators**

FOR Research and Development Work at the Association's modern headquarters in Sheffield.

**1. Plant Engineering Section**

A professionally qualified MECHANICAL ENGINEER to study plant and equipment used in steel foundries with a view to improving performance or reliability. Some previous experience in the foundry industry or in work study techniques would be an advantage, but is not essential.

**2. Metallurgy Section**

A METALLURGIST with an honours degree or equivalent qualification to undertake long-term investigations on the deoxidation and desulphurization of steel. Some experience of or interest in vacuum techniques would be desirable.

Both posts offer excellent opportunities for contact with industry. Candidates, who should preferably be under the age of 30, should be interested not only in research, but in the practical application of the results of research.

The Association offers competitive salary scales, good superannuation arrangements and working conditions.

Applications to the Director,

**BRITISH STEEL CASTINGS RESEARCH ASSOCIATION**
**5 East Bank Road, Sheffield, 2**

## SITUATIONS VACANT—contd.

YOUNG qualified METALLURGIST required for Non-ferrous Foundry. Applicants must possess knowledge of Bronze and Nickel Alloy practice. Salary in accordance with qualification and experience. Housing available. Apply: PERSONNEL MANAGER, NEWMAN, HENDER & Co. LTD., Woodchester, Stroud, Glos.

FURNACEMAN required by progressive Iron Foundry on South Coast. Two Cupolas, Mechanised and Floor Sections. Experienced man of between 35 and 45, used to working without close supervision and in close collaboration with Metallurgist. Full details of qualifications and experience, in confidence, to PERSONNEL OFFICER, HAMWORTHY ENGINEERING LTD., Poole, Dorset.

VACANCY exists for an ANALYTICAL CHEMIST having considerable experience with non-ferrous alloys. Applications are invited from men aged about 30/40 years with the potential of rising to a senior position. Pension Scheme. Laboratory at present S.E.1, but moving to Woolwich in about six months. Apply GENERAL WORKS MANAGER, A. COHEN & Co. LTD., Rothsay Street, London, S.E.1.

**METALLURGICAL LABORATORY:**

Assistant is required for Metallurgical Control in the Works Foundries. A knowledge of the production of Copper Base Alloys, Metallography and Pyrometry is desirable.

*Apply:—*

**Personnel Manager,**
**J. Stone & Co. (Propellers) Ltd.**
**Woolwich Road,**
**CHARLTON, S.E.7**

## SITUATIONS VACANT—contd.

FREE LANCE REPRESENTATIVES required for Non-ferrous Foundry. Sand and die work. Ex commission. Box FL567, FOUNDRY TRADE JOURNAL.

EXPERIENCED IRON MOULDERS wanted, for Jobbing Foundry. Good wages paid. Apply: WALTER W. HOSKEN, LTD., 62, Willow Walk, Bermondsey, S.E.1.

FULL-TIME REPRESENTATIVE wanted for London area by Midland Iron and Brass Founders. Good opportunity for young man with foundry and/or engineering experience. Commencing remuneration by way of salary and expenses. Full particulars to Box FR565, FOUNDRY TRADE JOURNAL.

TECHNOLOGIST for grey iron Foundry, West Riding, Yorkshire. Young practical man required to control metal and sand mixtures and assist in production and development. The foundry is semi-mechanised and producing 50 tons High Quality castings weekly. Full details in writing to Box TF560, FOUNDRY TRADE JOURNAL.

MANAGER required for Vitreous Enamelling Shop handling a variety of Cast Iron and Sheet Iron products. Applicants should have experience in control and management of labour. State age, details of technical experience and salary expected. Box MR558, FOUNDRY TRADE JOURNAL.

GRAVITY DIE CASTING FOREMAN for small foundry on South Coast. Must be prepared to take full control and responsibility. Staff position, £18 per week. Write stating age and full details of past experience to Box GD555, FOUNDRY TRADE JOURNAL.

FOREMAN for modern fettling shop handling a large variety of small and medium size repetition castings. Must be a good organiser and fully familiar with fettling operations. Staff position with good pension scheme. SHOTTON BROS., LIMITED, Lodgefield Road, Halesowen.

FOUNDRY FOREMAN, age 30-45, required by expanding Iron Foundry in East Lancashire. Applicants should have sound technical and practical foundry experience, coupled with first rate supervisory ability, drive, and initiative. Prospects excellent. An attractive salary and pension scheme offered to successful applicant. Write giving full personal details and experience to Box FF540, FOUNDRY TRADE JOURNAL.

**MSL**

*have been retained to advise on the appointment of*

# CHIEF DESIGN ENGINEER

## Foundry Mechanisation

for the foundry division of a company designing and manufacturing mechanical handling equipment, situated 40 miles from London. He will be responsible to the local Director for the supervision of the contracts drawing office and for all design work connected with complete schemes of foundry mechanisation within the cost budget prepared by the estimating department. Starting salary around £1,500 to £1,750 with contributory pension scheme.

Candidates between 35 and 48 must be qualified mechanical engineers with experience in the design of conveyors and other mechanical handling gear. Knowledge of foundry processes is important and he must have had experience in control of a drawing office. Please send brief details in confidence quoting reference GT.3211 to H. C. S. Brand.

**MANAGEMENT SELECTION LIMITED**
**17 Stratton Street, London, W.1**

*In no circumstances will a candidate's identity be disclosed to our client unless he gives permission after a confidential interview at which he will be given full details of the appointment.*

# ESTIMATOR

**AN EXPERIENCED ESTIMATOR, aged 35/45, is required for a Mechanised Grey Iron Foundry in the Midlands.**

**Applications are invited from persons who have the ability to estimate from Drawings.**

**Commencing salary of £850 per year upwards according to experience.**

**Pension Scheme.**

**Apply:—Box EA566, Foundry Trade Journal.**

## MACHINERY WANTED

WANTED. Good light alloy furnace up to 500 lb. brass. Any type considered. Box WG545, FOUNDRY TRADE JOURNAL.

BRITISH Moulding Machine type HPL 1 or 2 required, preferably in good working order, but minor repairs not objected to. Box BM547, FOUNDRY TRADE JOURNAL.

WANTED. Split Moulding Boxes, 30 in. × 24 in. × 4 in. each half and 39 in. × 12 in. each half. DREWERY, DERWENT FOUNDRY, Pocklington.

MEDIUM sized Wheelabrator Shot Blasting plant required. Box MS559, FOUNDRY TRADE JOURNAL.

WANTED.—"Wadkin" Pattern Miller, "LQ" Recessor, Disc and Bobbin Sander, Dimension Sawbench, Spindle Moulder. Good prices paid for modern machines. "LONG MEADOW," Manor Lane, Whatton, Notts.

**Cleveland Plant and Machinery Co., Ltd.,**

*want your*

**Surplus Foundry Plant and Forging Equipment**

*Best prices given*

**Wharncliffe House**
**44 Bank Street**
**Sheffield, 1**
**Tel. No. 29051**

## MACHINERY FOR SALE

TWO Sommerfield Airless Shotblasting Machines. Suitable continuous or batch cleaning of light castings, etc. Running order. Box TS556, FOUNDRY TRADE JOURNAL.

- Large Stock of Geared Ladles up to 8 tons capacity.
- Several Roper Ladles and Roper Ladle hoists.
- British Moulding Machine, size A.T.3.
- Morris Screenerator, nearly new.
- New Bale-out and Lift-out Furnaces. Please send for illustrated leaflet.
- Sinex Knock-out Beam. 5-Tons capacity.
- August coke-fired Core Oven.
- Adaptable Moulding Machine.
- Jackman Sand Mill, 5ft. dia.
- Four Pneulec Royer Sand Mixers.
- Large stock of Moulding boxes, up to 24in. square.
- Cummings coke-fired furnace.
- Cummings oil sand mixer.
- New Suspended electric sieve.
- Luke & Spencer 24in. double-ended high speed Fettling Grinder, with three speed, independent drive, standard A.C. 3 phase.
- King 2-ton Electric hoist.

**ELECTROGENERATORS LTD.**
**Australia Road, Slough, Bucks.**
**Tel.: Slough 22877 & 22094**

## MACHINERY FOR SALE—*contd.*

FOR SALE:—

SUTTER Shell Moulding Machine. Foundry Plant and Machinery Slinger, 16 in. head, complete with bunker and belt feed.
Tilgham Wheelabrator, A.321.
For full list and appointment to view write or 'phone IDOSON MOTOR CYLINDER CO., LTD., Hainge Road, Tividale, Tipton, Staffs. 'Phone: TIPton 2411.

ONE used Lumsden 24 in. × 4 in. Double Ended Fettling Grinder with S/C motor drive, 400/3/50. Also new Norton 12 in. to 20 in. Double Ended Grinding Machines supplied. Enquiries to: THE MIDLAND MACHINE TOOL COMPANY, Loxdale Street, Bradley, Bilston, Staffs. Tel.: Bilston 42471/9.

B.E.N. 32 cub. ft. Automatic Twin Cylinder Air Compressor, 150 lb., 400/3/50, industrial type complete with Air Receiver and all electrical gear brand new, £255.
Martonair Hoist Type 300 lb. S273, new condition, list price £72, accept £17 10s.
Brand new 7½ H.P. Table Type Cutting Off Wheel 14 in., 400/3/50, £87 10s.
Brand new 7½ cub. ft. Automatic 150 lb. Air Compressor, 2 H.P., 400/3/50. £95.
GREATACRE ENGINEERING CO., LTD., Stanley Street, Newtown, Wigan. Phone: 45996.

MONOMETER SEMI-ROTARY FURNACE, two-ton capacity. Used on gunmetal. Two burners. Inspection: WHITLEY PARTNERS, LTD., Hunslet Road, Leeds, 10.

**TWW**

AIRLESS Rotary Barrel Shot Blast Machine ("Sand Wizard" by Constructional Engineering Co.), size 44 in. × 40 in., complete with elevators. Dust Extraction Plant, etc., arranged for 400/440/3/50 cycles.
B.M.M. Jolt Squeeze Turnover Moulding Machine, type RDO.
Coleman Wallwork WT562C Jolt Squeeze Turnover draw Moulding Machine.
Brayshaw Gas Fired Muffle Furnace, 40 in. × 30 in. × 18 in., with blower, unbricked.
Sirocco 30 in. dia. Cupola Blower.
Richards "Sandmaster" Portable Electric Sand Conditioning Machine.
15 cwt. Roper Hand Geared Crane Ladle, Oil Bath Gearing.
Pneulec Sand Rover No. 1, 400/440/3/50.
Wide range of Air Compressors always in stock.
Inspection:—
Thames Road, Silvertown, London, E.16.

**THOS. W. WARD LTD.**
**BRETTENHAM HOUSE, STRAND, LONDON, W.C.2.**
**'Phone TEMple Bar 1515 (12 lines.)**

*Remember · Wards might have it!*

**Roper LADLES**
**STOCK UP TO 51ON CAP.**
**E. A. ROPER & CO. LTD.**
**KEIGHLEY • Phone: 4215-6**

## MACHINERY FOR SALE—*contd.*

### MOULDING MACHINES

B.M.M. Type RDO. Jolt Squeeze turnover patt. draw, table 26 in. × 18 in.
B.M.M. Type AT5 turnover patt. draw, table 36 in. × 25 in.
B.M.M. Type TO3 hand squeeze turnover table 30 in. × 20 in.
Coleman-Wallwork WT562A Jolt Squeeze turnover patt. draw, table 24 in. × 19 in.
ADAPTABLE Hand Ram, large sizes.
OSBORN 704L. Jolt Squeeze stripper, patt. draw 8 in.
Britannia Pneu. Jolt Lift size No. 2, table 22 in. × 26 in.
Molineux X1 pin lift patt. draw shockless compressed air rapid combination jolt.

ROLLER CONVEYOR
14 in. wide, 2½ in. dia., 4 in. pitch, 8 ft. lengths.
18 in. wide, 2½ in. dia., 4 in. pitch, 10 ft. lengths.

*All types Foundry Plant in stock.*

**S. C. BILSBY & CO.,**
**Hainge Road, Tividale, Staffs**
**Tipton 2448**

FOR SALE

SAND MIXING Machines for moulding, by Alfred Herbert, size No. 1, first class condition. Two available, with prints. Write: SLAKIN, Betchworth.

FREE INSTALLATION OFFER. 300 lb. oil fired bale-out Furnace in good condition.
£110 (only two available).
Also 150 lb. lift-out oil or gas fired and 200 lb. coke.

**K. A. LEARMONTH, LTD.,**
**31, Panmure Road, S.E.26**
**FOR 9628**

**SPECIAL OFFER**

**Modern Cupola Installation**

comprising :—
Two 3 ton capacity Cupolas,
wet spark arresters,
drop bottom swivelling charging bucket,
blowing fans, etc.

Can be inspected in situ and is available at an attractive price loaded on to vehicle.

*Further details from—*

**Cleveland Plant & Machinery Co, Ltd.**
**Wharncliffe House, 44 Bank St.,**
Tel. No. Sheffield 29051

**SHOTBLAST MACHINES**

**All sizes. Rooms or Cabinets.**
**Ex stock or prompt delivery.**
**Low prices.**

*Try us for*

**Spare parts & tungsten carbide nozzles.**

*Fully illustrated Catalogue free on request*

**Actual Manufacturers:**

**ELECTROGENERATORS LTD.**
**AUSTRALIA ROAD, SLOUGH**
Telephone: SLOUGH 22877
***40 years of satisfactory service***

## MACHINERY FOR SALE—*contd.*

"WADKIN" Model "RS" 8-in. Centre Motorized Gap Bed Woodturning Lathe, travelling slide tool carriage, outside turning. DALTONS, Canal Street, Nottingham.

### MOULDING MACHINES

ZIMMERMAN Pneumatic. Jolt Squeeze Turnover Vibrate.
17 Type RPW1 20½ in. × 16 in.—draw 9 in.
1 Type RPW2 36 in. × 20 in.
Zimmerman Pneumatic. Jolt Squeeze Vibrate.
5 Type FR1 22 in. × 19½ in.—Pin Lift 4½ in.
1 Type FR2 28½ in. × 22 in.—Pin Lift 4½ in.

### CUPOLA FURNACES

No. 4 Roper Economic Cupola with Spark Arrestor—3/3½ tons grey iron per hour. Overall height 41 ft., 3 ft. 6 in. outside dia., 2 ft. dia. inside lining at tuyères. 1948. Very good condition.
Second Furnace with Spark Arrestor—Overall height 42 ft., 4 ft. 6 in. outside dia., 3 ft. 6 in. outside dia. chimney, 2 ft. 4 in. inside lining at tuyères. Fair condition.

**ENTWISLE & KENYON LIMITED**
**Accrington, Lancashire**
**Tel. 32631**

FOR DISPOSAL, unused Monorail Transporter and equipment, comprising 75 12 ft. rails, 16 6 ft. curved rails, one power waggon plus one trailer waggon, plus miscellaneous equipment for setting up system for conveyance. Original cost £3,000, best offers over £650. SPENCER BROS., 20 Chapel St., Liverpool, 3. Tel.: CENtral 5262.

BRAYSHAW Gas Fired Bale Out Furnace, complete in all respects including instrumentation.
G.E.C. Batch Type Horizontal Tempering Furnace with roller track. Complete in all respects.
WHITEFIELD MACHINERY & PLANT, LIMITED 48, Chatham Street, Edgeley, Stockport, Cheshire.

## PATENTS

THE Proprietors of Patent No. 699318 for "A Regenerative Refractory Furnace for Endothermically altering a Gaseous Material" desire to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

## AGENTS REQUIRED

AGENTS REQUIRED. Progressive group of non-ferrous foundries, producing aluminium gravity and pressure die-castings, bronze and aluminium sand castings, requires energetic agents with good connections in all areas of the U.K. Full details to Box PG546, FOUNDRY TRADE JOURNAL.

## MATERIALS WANTED

### WANTED

SLAGS and other waste materials containing cobalts, iron, nickel, manganese, titanium, magnesium, etc. Samples and prices please to: MESSRS. WENGERS, LTD., Etruria, Stoke-on-Trent.

## MATERIALS WANTED—*contd.*

**WANTED URGENTLY**

***Discarded Sacks, Slag Bags, Old Sacking.***

For good prices and prompt settlement sell to actual users.

**JOHN COTTON**
**(JUTE) LTD.**
**NUNBROOK MILLS**
**MIRFIELD · YORKSHIRE**
*Tel: Mirfield 3306-7*

**WANTED**

**SCRAP ELECTRODE CARBONS**
**GRAPHITE-OFFCUTS**

details of tonnages and samples to

**FINE GRINDING LTD**
**Blackhole Mine, Eyam, Derbys.**
**Phone: Eyam 227**

## MATERIALS FOR SALE

CERTAINLY I'll tell you. The fact is I was tired of paying for water, and when I was offered an air-dry material, I knew just what I would be paying for. Then when we came to use it we found it better than hops or chopped straw. Not only that, but it's cheaper and doesn't stink like the other stuff, and it's clean to handle. Have your secretary write them. Their service is first rate. That's right, Processed Foundry Manure. Them name's GINSTER BROS., Walsall. Or better still, I'll ring off, and you can 'phone them. Walsall 27367.

**pulverite**

**COAL DUST**

lowest in ash

**The STANDARD PULVERISED FUEL Co. Ltd**
*Head Office*
**47 VICTORIA STREET, WESTMINSTER**
**LONDON, S.W.1 TEL: ABBey 6255/6**

## PROPERTY FOR SALE

FOR SALE. Yorkshire Iron Foundry, currently producing about 15 tons engineering castings weekly. Good order book. Substantial freehold property with ample scope for development. Principal share-holders interested disposing of the company to concentrate on their other activities. Would be prepared to leave substantial percentage on mortgage or would accept shareholding in public company. Substantial taxation loss available. Replies from principals, their solicitors or accountants only. Box FS562, FOUNDRY TRADE JOURNAL.

## CAPACITY AVAILABLE

CALCIUM SILICIDE. Finely ground Calcium Silicide—for nodular iron-exothermic compositions, etc. now being successfully used by several foundries) at prices which save you money. TOXANE LIMITED, 47 High Street, Edgware, Middlesex. EDGware 6666.

CAPACITY available for Iron and Steel Castings, Sand and Shell Moulding, pattern making capacity. Enquiries invited: KNETE CASTINGS, LTD., Station Road, West Horndon, Essex.

VITREOUS ENAMELLING.—Capacity available for enamelling castings in all finishes (plain, mottle, marble, lustre, etc.). Prompt delivery by our own transport. THE RUSTLESS IRON CO., LTD., Trico Works, Keighley, Yorks. Tel.: Keighley 3737.

HEAT TREATMENT of Iron and Steel. Annealing, Normalising, Stress Relieving and Shotblasting. Prompt delivery by our own transport. THE RUSTLESS IRON CO., LTD., Trico Works, Keighley. Tel. Keighley 3737.

CAPACITY available for all types of engineering patterns, competitive prices. Satisfaction assured. S. WHITEHEAD, Engineers Patternmakers, Finsley Gate, Burnley. Tel. 3573.

## PATTERNMAKERS

PATTERNS for all branches of Engineering for Hand and Machine Moulding.—FURNESTON & LAWLOR, LTD., Letchworth.

FOR successful castings from your plant, Pressurecast matchplates, precision wood or metal pattern equipment can be purchased quickly, competitively, from BOOTH BROS. ENGINEERING, Baggrave Street, Leicester. Tel. 67020.

**PATTERNMAKERS**
**(Engineering) CO. LTD.**
**Shrewsbury Road, London, N.W.10**
**PATTERNS**
**CASTINGS**
*Phone:* **ELGAR 8831/2**

# G. PERRY & SONS LTD.

HALL LANE
LEICESTER

WOOD & METAL PATTERNS
PRESSURE CAST PLATES

OVER 150 SKILLED CRAFTSMEN AT YOUR SERVICE

TELEPHONE LEICESTER 32261

GLASS FIBRE REINFORCED
"EPOXY"
RESIN
PATTERN EQUIPMENT

Harvey & Longstaffe Ltd

We have ALREADY supplied over 500 sets of Epoxy Resin Pattern Equipment to OVER 45 well-known Foundries.

Our RESOURCES and EXPERIENCE are at YOUR service!

DAWSON RD., BROADHEATH, ALTRINCHAM, CHESHIRE.
Tel: ALTRINCHAM 3341

*Technical Representatives are always available to discuss your requirements upon request.*

PATTERN SHOP SUPPLIES
ALL BRITISH

JOHN BURN & CO. (B'HAM) LTD.
5 HENSHAW ROAD, SMALL HEATH, BIRMINGHAM 10
Phone: VICTORIA 0137
ESTD. 1904
Grams: REQUISITES B'HAM

**Patterns** by **Passe** of **Paisley**

*Serving all branches of Engineering*

**J. F. PASSE & CO**

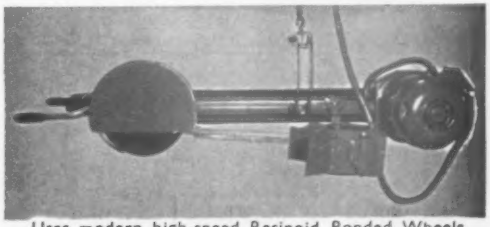
FORBES PLACE, PAISLEY

*Telephone:* PAISLEY 2553

Ballinger **SWING FRAME**

**FETTLING GRINDER**

Simple, powerful and effective with all essential features for the rapid removal of excess metal from castings and welded structures. Removing one pound of metal in 3 mins.



Uses modern high-speed Resinoid Bonded Wheels 12" dia., powered by 3 h.p. totally enclosed motor, tilts at any angle and fitted with spark arrester.

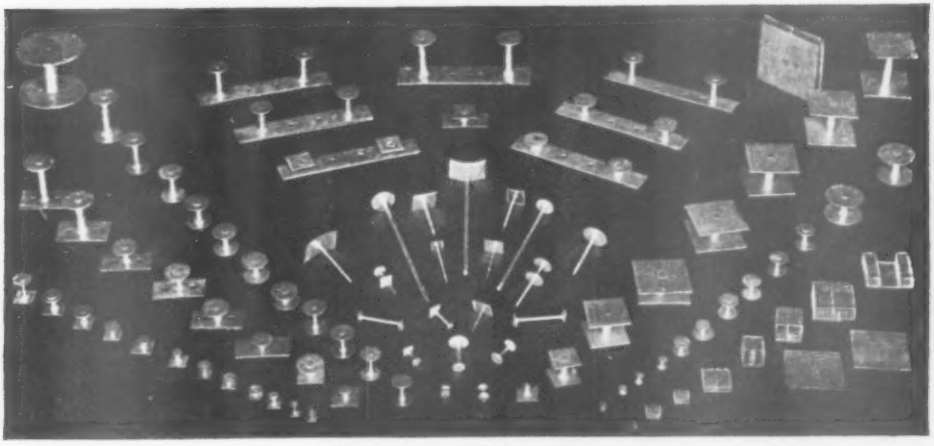
*Write for List III*

**L. J. H. BALLINGER LTD.**

Station Rd., Woodchester, Gloucestershire. *Phone: Amberley 2186*

*FAITHFUL SERVICE TO THE FOUNDRY INDUSTRY*

(ESTABLISHED 1932)



*Send your enquiries to:—*

**NICHOLL & WOOD LTD** · NETHERTON WORKS HOLMFIELD · HALIFAX

*Manufacturers of* *Telephone HX 64484*

CHAPLETS & STUDS · STANDARD STUDS FROM STOCK · SPECIAL SIZES IN ANY SHAPE OR PATTERN MADE TO CUSTOMERS REQUIREMENTS AT SHORT NOTICE

**B. LEVY & COMPANY (PATTERNS) LIMITED**

*FULLY-MACHINED METAL PATTERNS, coreboxes, core-driers and setting-jigs for SHELL-MOULDING and machines.*
*WOODEN PATTERN EQUIPMENT of all sizes and types for loose-pattern and plate moulding.*
*EPOXY RESIN MULTIPLES and replacement equipment. (Plastic Patterns)*
KEEN QUOTATIONS RELIABLE DELIVERIES
B. LEVY & CO. (PATTERNS) LTD., 1-5 OSBERT STREET, LONDON, S.W.1
TELEPHONE : VICTORIA 1073 or 7486

**COKE**
FOR ALL PURPOSES
CAWOOD WHARTON & CO. LTD.
"SCUTHLANDS" HARROGATE. Tel. Harrogate 6868.
ST. MARTIN'S HOUSE, LONDON, S.E.18 Tel. Woolwich 5232.

**JAS. EVANS & CO. LTD.**
EVERYTHING FOR THE FOUNDRY

| | |
|---|---|
| CUPOLAS | MOULDING BOXES |
| WET & DRY SPARK ARRESTORS | STUDS AND CHAPLETS |
| LADLES | BRUSHES |
| SAND MIXING PLANT | RIDDLES AND SIEVES |
| SAND DRIERS | SPRIGS AND NAILS |
| BARROWS | PLUMBAGO |

BRITANNIA WORKS, CROSS ST., SALFORD, 3, Lancs.

## SUBSCRIPTION ORDER FORM.

*To the PUBLISHER*

**FOUNDRY TRADE JOURNAL**

With which is incorporated "THE IRON & STEEL TRADES JOURNAL"

TELEPHONE : TRAFALGAR 6171 — JOHN ADAM HOUSE 17/19 JOHN ADAM STREET ADELPHI · LONDON · W.C.2 — TELEGRAMS : "ZACATECAS. RAND. LONDON."

Please send the **FOUNDRY TRADE JOURNAL** to the address given below until countermanded, for which **£2.12.0.** (Home) **£3. 0.0.** (Abroad) is enclosed in payment of One Year's Subscription.

*Name*.....

*Address*.....

*Date*.....

**Cheques and Post Office Orders to be made payable to:—INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LTD.**

# ANDERSON CRANES

*Specially Developed for Foundry Duty*

Anderson Cranes have a high reputation for modern design and construction coupled with unsurpassed workmanship all of which ensure the absolute reliability and efficiency so essential in every foundry.

Cage or floor operation ; totally enclosed gearboxes ; slow speed control.

TEL: CARNOUSTIE 2214/5 and 2110

**THE ANDERSON-GRICE CO. LTD.**

TAYMOUTH ENGINEERING WORKS · CARNOUSTIE · SCOTLAND

GRAMS: "DIAMOND" CARNOUSTIE

---

Low Phosphorus and Sulphur contents used for High duty castings, Cylinders, Piston Rings, Rolls, etc., and in Open-Hearth and Electric Steel Making

# NORWEGIAN

ALL-MINE ELECTRIC

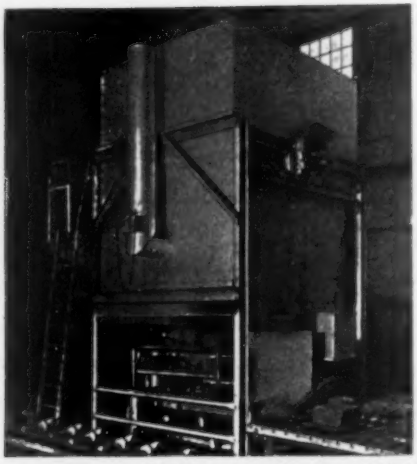
# PIG IRON

CONTAINING VANADIUM & TITANIUM

Bremanger Vanitit

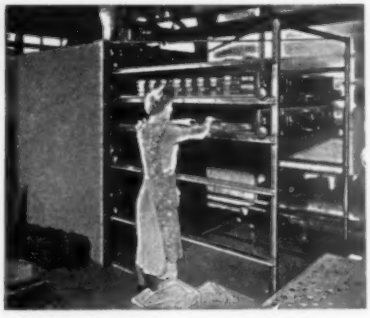
APPLY TO:

DUNFORD & ELLIOTT (SHEFFIELD) LTD · Attercliffe Wharf Works, Sheffield, 9.
Telephone Nos. 41121 (5 lines). Telegrams: Blooms, Sheffield, 9



# Industrial Ovens

BALLARD
THE NAME CONVEYING OVENS



**F. J. BALLARD**
**AND CO. LTD**
**TIPTON, ENGLAND**

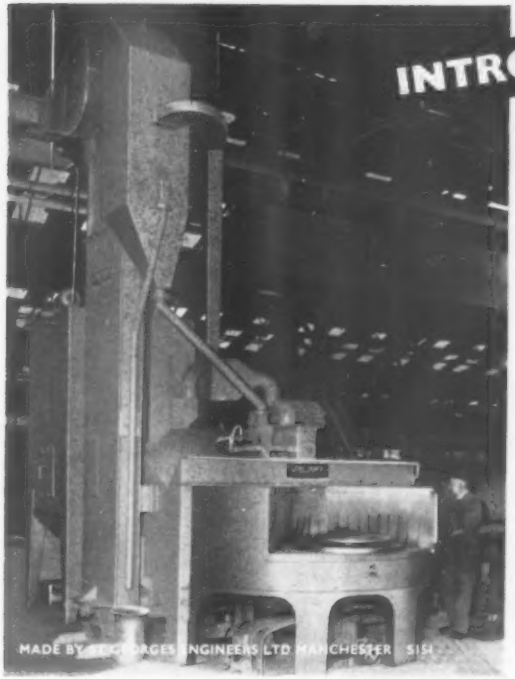
**BILSTON** *Rolled Steel* **MOULDING BOXES**

Interchangeable · Accurately jigged and reamed. Withstand rough handling. Long life without distortion. Sizes and shapes to requirements.

**BILSTON STOVE & STEEL TRUCK CO. LIMITED**
BILSTON • Phone: BILSTON 41921 • STAFFS

• *Agents for Southern England*

**FOUNDRY SUPPLIERS LIMITED.**
**25A, Cockspur St., London, S.W.1** *'Phone: TRAfalgar 1141*




INTRODUCING

THE NEW

# DUAL PURPOSE

## WHEELBLAST TURNTABLE SHOT BLAST PLANT

This new machine combines all the advantages of the DUAL-TABLE and ROTARY-TABLE type plants. With the auxiliary tables in position the machine is ideally suited to quantity production, being particularly useful for cleaning complicated or fragile pieces, with difficult, deep pockets.

With the auxiliary tables removed—(the work of a few minutes) the plant becomes a Rotary Table type—a valuable general purpose machine for the cleaning of shallow or flat parts.

*NO LIMIT TO SIZE*

**ST. GEORGES ENGINEERS LIMITED**
**ORDSALL LANE MANCHESTER 5**
*Phone: TRAfford Park 1207 (4 lines) Grams: 'Georgic' Manchester 5*

KG

# CYCLONE

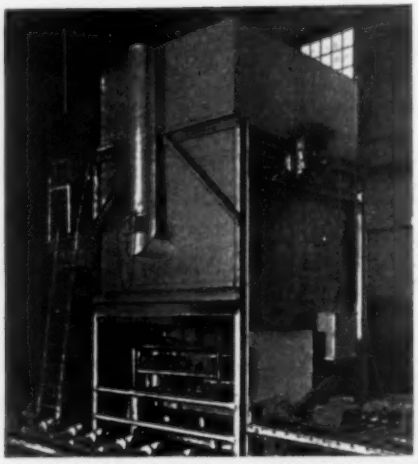
## SYSTEMS FOR FOUNDRIES

***DUST REMOVAL, VENTILATION, FUME EXTRACTION, COOLING, COLEMAN CORE AND MOULD OVENS***

**MATTHEWS & YATES LTD.**

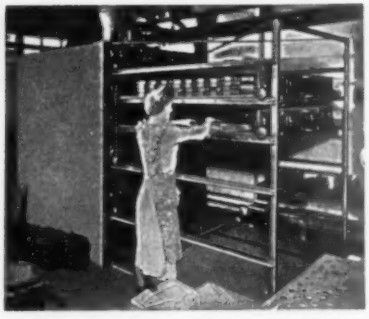
These Cyclone Plants improve conditions and increase output. If you are at the planning stage for new Plant, or improving existing works, please ask for our advice and benefit from our 75 years' experience.

HEAD OFFICE & WORKS:
**CYCLONE WORKS SWINTON, MANCHESTER. Tel: SWinton 2273 (4 lines)**
LONDON OFFICE:
**135 RYE LANE, PECKHAM, LONDON, S.E.15. Tel: NEW Cross 6571 (4 lines)**
ALSO AT :- GLASGOW · LEEDS · BIRMINGHAM · CARDIFF · BOURNEMOUTH



# Industrial Ovens

BALLARD
THE NAME CONVEYING OVENS



**F. J. BALLARD**
**AND CO. LTD**
**TIPTON, ENGLAND**

**BILSTON**

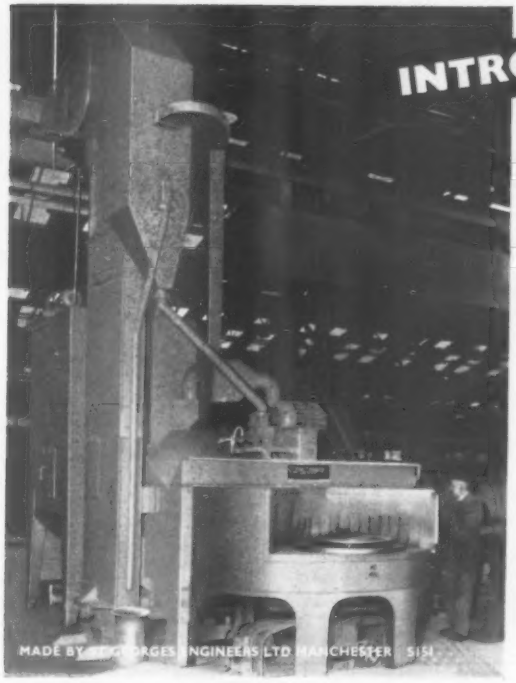
*Rolled Steel*
**MOULDING BOXES**

Interchangeable · Accurately jigged and reamed. Withstand rough handling. Long life without distortion. Sizes and shapes to requirements.

**BILSTON STOVE & STEEL TRUCK CO. LIMITED**
BILSTON • *Phone: BILSTON 41921* • STAFFS

• *Agents for Southern England*

**FOUNDRY SUPPLIERS LIMITED.**
**25A, Cockspur St., London, S.W.1** *'Phone: TRAfalgar 1141*




INTRODUCING

THE NEW

# DUAL PURPOSE

## WHEELBLAST TURNTABLE SHOT BLAST PLANT

This new machine combines all the advantages of the DUAL-TABLE and ROTARY-TABLE type plants. With the auxiliary tables in position the machine is ideally suited to quantity production, being particularly useful for cleaning complicated or fragile pieces, with difficult, deep pockets.

With the auxiliary tables removed—(the work of a few minutes) the plant becomes a Rotary Table type—a valuable general purpose machine for the cleaning of shallow or flat parts.

***NO LIMIT TO SIZE***

**ST. GEORGES ENGINEERS LIMITED**
**ORDSALL LANE MANCHESTER 5**
*Phone: TRAfford Park 1207 (4 lines) Grams: 'Georgic' Manchester 5*

# CYCLONE

## SYSTEMS FOR FOUNDRIES

***DUST REMOVAL, VENTILATION, FUME EXTRACTION, COOLING, COLEMAN CORE AND MOULD OVENS***

**MATTHEWS & YATES LTD.**

These Cyclone Plants improve conditions and increase output. If you are at the planning stage for new Plant, or improving existing works, please ask for our advice and benefit from our 75 years' experience.

HEAD OFFICE & WORKS:
**CYCLONE WORKS SWINTON, MANCHESTER. Tel: SWinton 2273 (4 lines)**
LONDON OFFICE:
**135 RYE LANE, PECKHAM, LONDON, S.E.15. Tel: NEW Cross 6571 (4 lines)**
ALSO AT :- GLASGOW · LEEDS · BIRMINGHAM · CARDIFF · BOURNEMOUTH

# ARTHUR SMITH (S & B FOUNDRY SANDS) LTD.,

**COTES HEATH,**
**STAFFORD.**

*Telephone: Standon Rock 232.*

Quarry at:
Swynnerton Red Moulding Sand,
Lower Hatton Quarry,
Cotes Heath,
Stafford.

Quarry at:
Brereton Core Sand,
Brereton Heath
Holmes Chapel Road,
Nr. Sandbach, Cheshire.

**WE CAN NOW OFFER A FULL RANGE OF FOUNDRY SANDS FOR ALL METHODS OF FOUNDRY PRACTICE:**

**CLASSIFIED AND LABORATORY TESTED FOUNDRY SANDS.**

*B. C. S. Fine.* *C. C. S. Medium* *S. R. M. S. Fine.* *N. W. Fine.*
*C. C. S. Coarse.* *Southport Sea Sand.* *S. R. M. S. Coarse.* *N. W. Coarse.*

***Samples and Analysis supplied on request.***

HIGH SPEED
— LIMITED —
STEEL ALLOYS

WIDNES, LANCS.

TEL: WIDNES 2661. GRAMS: ALLOYS, WIDNES

| | | | |
|---|---|---|---|
| TUNGSTEN METAL POWDER | 98/99% | PURE CHROMIUM | 96/99% |
| FERRO-TUNGSTEN | 80/85% | MANGANESE METAL | 95/99% |
| FERRO-VANADIUM | 35/85% | FERRO-MOLYBDENUM | 70/80% |

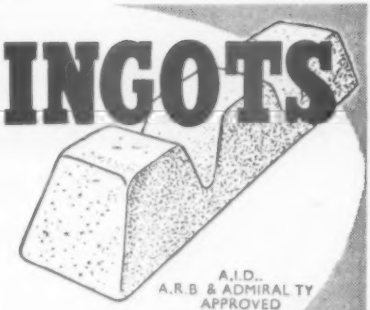
CARBON FREE ALLOYS OF METALS. METALLIC CARBIDES

***SUPPLIED IN SPECIAL SIZES FOR FOUNDRY REQUIREMENTS***

**SPECIFICATION BOOKLET ON REQUEST.**

# NON-FERROUS INGOTS

SINCE 1888



A.I.D., A.R.B. & ADMIRALTY APPROVED

- GUNMETAL • BRASS
- PHOSPHOR-BRONZE
- LEAD-BRONZE
- BRAZING METAL
- MANGANESE-BRONZE
- ALUMINIUM-BRONZE
- NICKEL SILVER • ALUMINIUM

*ALSO SELECTED SCRAP METALS*

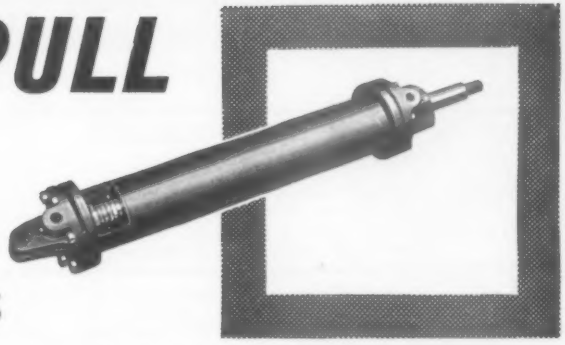
**THE CITY CASTING & METAL CO. LTD.**

**BARFORD STREET • BIRMINGHAM 5**

*Telegraphic Address: "Turnings" Birmingham* *Telephone: MIDLAND 0645*

# PUSH or PULL

WITH BRADFORD
AIR OR
HYDRAULIC
POWER CYLINDERS



Bradford Power Cylinders are made in standard sizes from 2″ to 20″ bore, or to specification with any length of stroke, as required. Suitable for air, hydraulic fluid, or oil. Robust design for heavy duties.

**U.S.M.P**

**UNITED STATES METALLIC PACKING CO. LTD.**
**SOHO WORKS, BRADFORD 8**
**TEL. 41284-5 TELEGRAMS: 'METALLIC' BRADFORD**

*Branch Offices:*
*London, Liverpool, Glasgow, Manchester, Newcastle, Cardiff, Southampton, Hull, Swansea and Bristol.*

When you can't see for dust — see ...

**DUSTRACTION**

Specialists in dust and fume control
and pneumatic conveying

DUSTRACTION LTD, 94, REGENT ROAD · LEICESTER · Telephone : 28681

**COMLEY** *for Coke...*

For the best **ROAD-BORNE** ***Foundry Coke*** service in the Midlands, ask **COMLEY'S.**
* If you don't believe us—ask our customers.

**ALEXANDER COMLEY**
**( FOUNDRY DIVISION ) LTD.**

PENSNETT TRADING ESTATE,
BRIERLEY HILL, STAFFS.
KINGSWINFORD 3074

**BLACK SEAM AND HISEGAR REFRACTORIES**
Linings, Patchings, Cements, Ground Fireclay.
Firebricks, Foundry Sands and Compo.
**MIDLAND MONOLITHIC FURNACE LINING COMPANY LIMITED**
GOOSE LANE, BARWELL, LEICESTER

**BLACK SEAM**
preheated downdraught
**CRUCIBLE FURNACES**
Coke, Oil or Gas Fired
*Free demonstrations at your works*
Tel. Earl Shelton 2061/2 (2 lines)

Milled and Unmilled Moulding Sand for Iron and Brass Foundries from our Cheshire Pits

**The Warrington Red Moulding Sand Co.**

**33 BOLD STREET, WARRINGTON**
Tel. 34121-2-3-4-5

**HARGRAVES BROS.**
**(MANCHESTER) LTD.**
**31, QUAY STREET, MANCHESTER, 3.**
**SPADES—SHOVELS**
**COKE FORKS**
**'PHONE BLACKFRIARS 9510**
***FOR ALL FOUNDRY SUPPLIES***

CONTACT THE SPECIALISTS

# NORWEGIAN OLIVINE SAND

FOR STEEL FOUNDRIES

More and more Steel Foundries—particularly in Manganese Steel, are turning to the use of Olivine Sand, for its technical advantages, and in reducing and eliminating the silicosis hazard. Trial deliveries in bags can be arranged, with supplies in bulk shipments at very keen prices, for tonnages.

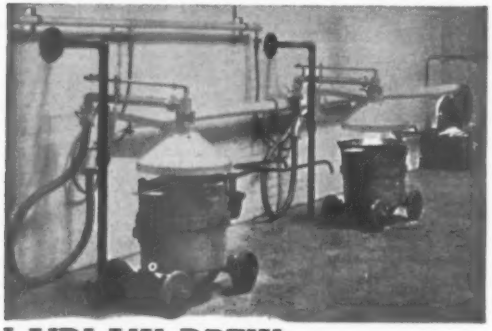
You should enquire now for full details and quotations from:—

**PRODUCTION CHEMICALS (Rochdale) LTD.**

Victoria Buildings, 32 Deansgate, Manchester 3

*Telephone:* Blackfriars 3396 & 3851 *Telegrams/Cables:* Chemprodux, Manchester

INT. TELEX: 66-330



LAIDLAW DREW

**LADLE HEATING**

*Equipment*

The illustration shows our town's gas fired equipment applied to bogey ladles at the Works of Grahamston Iron Co. Ltd., Falkirk. Similar equipment can be provided for all types of gas as well as liquid fuels.

LAIDLAW DREW & CO., LTD.

SIGHTHILL INDUSTRIAL ESTATE, EDINBURGH, 11

*Telephone:* CRAiglockhart 4422 *Telegrams:* "ERICLEX, EDINBURGH"

London Office:—63, QUEEN VICTORIA STREET, LONDON, E.C.4. Tel.: CITy 1155 6

AMBER OILS LIMITED

*announce*

*Reduced Prices*

*for*

# *AMBERSIL*

*FORMULAS ONE and TWO*

THE FINEST ANTI-STICK AND MOULD RELEASE AGENTS

★ High Heat Resistance
★ Low Surface Tension
★ Water Repellant
★ Non-Inflammable, Inert
★ Simple Aerosol Application
★ Penetrates Inaccessible Areas
★ Reduces Rejects
★ Improves Finish
★ Handy Economic 12 oz. Size

*New Prices Per 12 oz. Aerosol*

(Delivered Free)

**FORMULAS 1 & 2**

| *Singles* | *1 Dozen* | *2 Dozen* | *6 Dozen* | *1 Gross* |
|---|---|---|---|---|
| 15/- | 13/- | 12/- | 11/- | 10/- |

AMBER OILS LIMITED

11A, ALBEMARLE STREET, LONDON, W.1.

*Mayfair 6161/5*

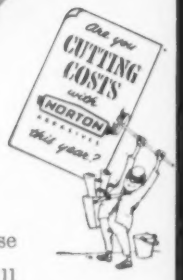
# INDEX TO ADVERTISERS


| | Page Nos. |
|---|---|
| A.E.I.-Birlec, Ltd. | — |
| Acme Conveyors, Ltd. | 31 |
| Air Control Installations Ltd. | — |
| Albion Diemakers, Ltd. | — |
| Alcan (U.K.), Ltd. | — |
| Allan, John, & Co. (Glenpark), Ltd. | — |
| Allen, W. G., & Sons (Tipton), Ltd. | — |
| Amafond | — |
| Amber Oils, Ltd. | 51 |
| Anderson-Grice Co., Ltd. | 45 |
| Annealers, Ltd. | — |
| Armstrong Whitworth (M.I.), Ltd. | — |
| Armstrong Whitworth & Co. (Pneu. Tools), Ltd. | — |
| Ashworth Ross Co., Ltd. | — |
| Aske, Wm., & Co., Ltd. | — |
| Ass. Lead Mfrs., Ltd. | — |
| Atlas Copco (G.B.), Ltd. | — |
| August's, Ltd. | 36 |
| Austin, E., & Sons, Ltd. | — |
| Badische Maschinenfabrik A.-G. | 15 |
| Bairds & Scottish Steel, Ltd. | — |
| Baker Perkins, Ltd. | 127 |
| Balbardie, Ltd. | 125 |
| Ballard, F. J., & Co., Ltd. | 46 |
| Ballinger, L. J. H., Ltd. | 43 |
| Beck, H., & Son, Ltd. | — |
| Belliss & Morcom, Ltd. | — |
| Bennett, H. G., & Co. (Gloves), Ltd. | — |
| Berk, F. W., & Co., Ltd. | — |
| Bilston Shot & Grit Co., Ltd. | — |
| Bilston Steel & Steel Truck Co., Ltd. | — |
| Birkett, F. W., & Co., Ltd. | — |
| Birlec-Efco (Melting), Ltd. | — |
| Blackwell's Metallurgical Works, Ltd. | — |
| Block & Anderson, Ltd. | — |
| Bloomer-Holt, Ltd. | — |
| Boydell, E., & Co., Ltd. | — |
| Bradbury, John, & Co. (Stockport), Ltd. | — |
| Bradley & Foster, Ltd. | 9 |
| British Acheson Electode Ltd. | — |
| British Aero Components, Ltd. | — |
| British Electrical Repairs, Ltd. | — |
| British Foundry Units, Ltd. | 2 |
| British Industrial Sand Ltd. | — |
| British Iron & Steel Federation | — |
| British MonoRail, Ltd. | — |
| British Moulding Machine, Co., Ltd. | — |
| British Oxygen Co., Ltd. | — |
| British Rototherm, Ltd. | 22 |
| British Shotblast & Engineering Co., Ltd. | — |
| Bromhead & Denison, Ltd. | — |
| Broom & Wade, Ltd. | — |
| Buckland Sand & Silica Co., Ltd. | — |
| Burn, John, & Co. (B'ham), Ltd. | 42 |
| Burnand, W. E., & Son, Ltd. | — |
| Canning, W., & Co., Ltd. | — |
| Carborundum Co., Ltd. | 33 |
| Catalin, Ltd. | 19 |
| Cawood Wharton & Co., Ltd. | 44 |
| Centrozap Foundry Machines | — |
| Chapman & Smith, Ltd. | — |
| Chemicals & Feeds, Ltd. | — |
| Chetham Timber Co., Ltd. | — |
| Churchill, Charles, & Co., Ltd. | — |
| Ciba (A.R.L.), Ltd. | — |
| City Casting & Metal Co. Ltd. | 49 |
| Clayton Crane & Hoist Co. Ltd. | — |
| Cleanair, Ltd. | — |
| Cohen, Geo, Sons & Co., Ltd. | — |
| Coleman-Wallwork Co., Ltd. | — |
| Combustion Chemicals, Ltd. | — |
| Comley, A., Ltd. | 50 |
| Consolidated Pneumatic Tool Co., Ltd. | — |
| Constructional Engineering Co., Ltd., The | — |
| Controlled Heat & Air, Ltd. | — |
| Conveyor & Shotblast, Ltd. | 14 |
| Cooke, Bailey, Ltd. | — |
| Coreshooters Sales Ltd. | 32 |
| Cox & Danks, Ltd. | 32 |
| Crockett Lowe, Ltd. | — |
| Crooks, L. E. | — |
| Cumming, Wm., & Co., Ltd. | 11 |
| Dallow, Lambert & Co., Ltd. | — |
| Dickson, Roy Wilson Ltd. | — |
| Distillers Co., Ltd., The | 8 |
| Distington Engineering Co., Ltd. | — |
| Dowler, H. J., Engineers & Pattern Makers, Ltd. | — |
| Dowson & Mason, Ltd. | — |
| Dunford & Elliott, Ltd. | 45 |
| Durrans, James, & Sons, Ltd. | — |
| Dustraction | 50 |
| Dustuctor Co., Ltd. | 50 |
| Dyson, J. & J., Ltd. | — |
| Electrical Development Assoc. | — |
| Electrogenerators, Ltd. | 1 |
| Elliott, E. & C., Ltd. | — |
| Engineering Services (Manchester), Ltd. | — |
| Escol Products, Ltd. | — |
| Evans, James, & Co., Ltd. | 44 |
| Evans, Roy, M.I.B.F. | 32 |
| Evans, Stanley N., Ltd. | — |
| Eyre Smelting Co., Ltd. | — |
| F. & M. Supplies, Ltd. | 123 |
| Felco Hoists, Ltd. | — |
| Filter-Heat, Ltd. | 5 |
| Fischer, George, Ltd. | — |
| Fisher-Foundries, Ltd. | — |
| Fletcher Miller, Ltd. | — |
| Flextol Engineering Co. Ltd. | — |
| Floodgate Steel Fabricating Co., Ltd. | — |
| Fordath Engineering Co., Ltd. | 34 |
| Foseco International, Ltd. | 13 |
| Foundry Equipment, Ltd. | 28 & 29 |
| Foundry Mechanisations (Baillot), Ltd. | 23 |
| Foundry & Metallurgical Equipment Co., Ltd. | 6 |
| Foundry Plant & Machinery, Ltd. | — |
| Foundry Services, Ltd. | — |
| Foundry Suppliers, Ltd. | 46 |
| Foxboro Yoxall, Ltd. | — |
| Frankiss, R. J. (Patterns) Ltd. | — |
| Franklin Furnaces, Ltd. | — |
| Fringevision, Ltd. | — |
| Fuel & Metallurgical Processes, Ltd. | 12 |
| Fullers' Earth Union, Ltd. The | — |
| G.W.B. Furnaces, Ltd. | 7 |
| Gadd, Thos. | — |
| Gas Council | — |
| General Refractories, Ltd. | — |
| Gesellschaft fur Huttenwerksanlagan m.b.h. | — |
| Gilbert, G. & R. (Industrial), Ltd. | — |
| Gliksten, J., & Son, Ltd. | — |
| Goodyear Tyre & Rubber Co., Ltd. | — |
| Green, E., & Son, Ltd. | — |
| Green, Geo., & Co. | — |
| Gregory, J. G., & Sons, Ltd. | — |
| Griffiths, A. E. (Smethwick), Ltd. | — |
| Guest, Keen Iron & Steel Co., Ltd. | — |
| Guyson Industrial Equipment Ltd. | — |
| Harborough Construction Co., Ltd. | — |
| Hargraves Bros. (Manchester), Ltd. | 50 |
| Harris & Pearson, Ltd. | — |
| Harvey & Longstaffe, Ltd. | 42 |
| Harvey, J. J. & Pressurecast, Ltd. | — |
| Hatcham Rubber Co., Ltd. | — |
| Hedin, Ltd. | — |
| Heneage Metals, Ltd. | — |
| Hepburn Conveyor Co., Ltd. | — |
| Heywood, S. H., & Co., Ltd. | — |
| High Speed Steel Alloys Ltd. | 48 |
| Hills (West Bromwich), Ltd. | — |
| Holman Bros., Ltd. | — |
| Holmes, W. C., & Co., Ltd. | — |
| Holroyd & Hall, Ltd. | — |
| Hooker, W. J., Ltd. | — |
| Hunt, F. L., Ltd. | — |
| I.C.I. (Billington Division), Ltd. | — |
| I.C.I. (Plastics Division), Ltd. | — |
| Ilford, Ltd. | — |
| Impregnated Diamond Products, Ltd. | — |
| Incandescent Heat Co., Ltd. | — |
| Ingersoll-Rand Co., Ltd. | — |
| Jackman, J. W., & Co., Ltd. | 3 |
| Jacks, Wm., & Co., Ltd. | 37 |
| Joy-Sullivan, Ltd. | — |
| Keith Blackman, Ltd. | — |
| Kenilworth Mfg. Co., Ltd. | — |
| King, Geo. W., Ltd. | — |
| Lafarge Aluminous Cement Co., Ltd. | — |
| Laidlaw, Drew & Co., Ltd. | 51 |
| Lazarus, Leopold, Ltd. | — |
| Leicester Lovell & Co., Ltd. | 10 |
| Levy, B., & Co. (Patterns), Ltd. | 44 |
| L.M.S. Products, Ltd. | — |
| Lones, Joseph Laboratories | — |
| Lord, E. S., Ltd. | — |
| Luke & Spencer, Ltd. | 30 |
| Macnab & Co., Ltd. | — |
| Major, Robinson & Co., Ltd. | — |
| Mansfield Standard Sand Co., Ltd. | — |
| Marco Conveyor & Engineering Co., Ltd. | — |
| Mathison, John, Ltd. | — |
| Matthews & Yates, Ltd. | 47 |
| May, J. H., Ltd. | — |
| McKechnie Bros., Ltd. | — |
| Metalectric Furnaces, Ltd. | — |
| Metalline Cement Co., The | — |
| Metals & Equipment (Wolverhampton), Ltd. | 25 |
| Midgley & Son, Ltd. | — |
| Midland Monolithic Furnace Lining Co., Ltd. | 50 |
| Mine Safety Appliances, Ltd. | — |
| Modern Furnaces & Stoves, Ltd. | — |
| Molineux Foundry Equipment, Ltd. | — |
| Monomester Manufacturing Co., Ltd. | — |
| Mond Nickel Co., Ltd. | — |
| Morgan Crucible Co., Ltd. | 18 |
| Morris, B. O., Ltd. | — |
| Morris, H., Ltd. | 20 |
| Moyle, Victor & Co., Ltd. | — |
| Muir, Murray & Co., Ltd. | — |
| Newton Collins, Ltd. | — |
| Newman Hender & Co., Ltd. | — |
| Nicholl & Wood, Ltd. | 43 |
| Norris Equipment & Construction, Ltd. | — |
| Norton Grinding Wheel Company, Ltd. | 53 |
| Nundy Marine Metals, Ltd. | — |
| Ormerod, R. E., Ltd. | — |
| Palmer Aero Products, Ltd. | — |
| Parish, J., & Co., Ltd. | 54 |
| Park & Paterson, Ltd. | — |
| Parker Mitchell Engineering Co., Ltd. | — |
| Passe, J. F., & Co. | 43 |
| Paterson Hughes Engineering Co., Ltd. | — |
| Patterncrafts, Ltd. | — |
| Pearson, E. J. & J., Ltd. | — |
| Peco Machinery Sales, Ltd. | — |
| Perry, G., & Sons, Ltd. | 42 |
| Phillips, J. W. & C. J., Ltd. | — |
| Pickard, W., & Co., Ltd. | — |
| Pickford, Holland, Ltd. | — |
| Platt Metals, Ltd. | — |
| Pneulec, Ltd. | — |
| Podmore, W., & Sons, Ltd. | — |
| Polygram Castings Co., Ltd. | — |
| Precision Presswork Co., Ltd. | — |
| Price, J. T., & Co., Ltd. | — |
| Production Chemicals (Rochdale), Ltd. | 51 |
| Purimachos, Ltd. | — |
| Rapid Magnetic, Ltd. | — |
| Reavell & Co., Ltd. | — |
| Refined Iron Co. (Darwen), Ltd. | — |
| Reid, Wm., & Co. | — |
| Resinous Chemicals, Ltd. | — |
| Richards Structural Steel Co., Ltd. | — |
| Richardson Eng'g., Ltd. | — |
| Richardsons, R.J. & Sons Ltd. | — |
| Ridsdale & Co., Ltd. | — |
| Riley (IC) Products, Ltd. | — |
| Robson Refractories, Ltd. | 54 |
| Roper, E. A., & Co., Ltd. | — |
| Rowland, F. E., & Co., Ltd. | — |
| Rownson (Conveyors), Ltd. | — |
| Rubery Owen & Co., Ltd. | — |
| Rule & Moffat | — |
| Rustless Iron Co., Ltd. | — |
| Safety Products, Ltd. | — |
| Salter, Geo., & Co., Ltd. | — |
| Schieldrop & Co., Ltd. | — |
| St. George's Engineers, Ltd. | 47 |
| Sheffield Smelting Co., Ltd. | — |
| Shell Chemical Co., Ltd. | — |
| Sheppard & Co, Ltd. | — |
| Sinex Eng'g. Co., Ltd. | — |
| Sintokogio, Ltd. | — |
| Sklenar Furnaces, Ltd. | — |
| Smedley Bros., Ltd. | — |
| Smeeton, J. A., Ltd. | — |
| Smith, A., & Co. | 48 |
| Smith, A. (S. & B. Foundry Sands), Ltd. | — |
| Smith, John (Keighley), Ltd. | — |
| Sommerfield, H. G., Ltd. | — |
| Spencer & Halstead, Ltd. | 17 |
| Spermolin, Ltd. | — |
| Stansby, W., & Co., Ltd. | — |
| Stanton Ironworks Co., Ltd., The | — |
| Staveley Iron & Chemical Co., Ltd. | — |
| Steels Engineering Installations | — |
| Stein, John G., & Co., Ltd. | — |
| Stephens, Wm., & Sons, Ltd. | — |
| Sterling Foundry Specialties, Ltd. | 27 |
| Sternol, Ltd. | — |
| Suffolk Iron Foundry (1920), Ltd. | — |
| Tallis, E., & Sons, Ltd. | 26 |
| Taylor, J. (Syston), Ltd. | — |
| Taylor Patterns, Ltd. | — |
| Thomas, G. & R., Ltd. | — |
| Thomas, Gwyn & Co. | — |
| Thompson, John, Instrument Co., Ltd. | — |
| Thomson & McIntyre | — |
| Tilghman's, Ltd. | 24 |
| Union Carbide, Ltd. | — |
| Unit Engineering Co. | — |
| United Fireclay Products, Ltd. | 21 |
| United States Metallic Packing Co., Ltd. | 49 |
| Universal Pattern & Precision Engineering Co., Ltd. | — |
| Verrolec, Ltd. | 16 |
| Victor Products, Ltd. | — |
| Wal-Met Alloys Co. | — |
| Walker, I. & I., Ltd. | 54 |
| Walsh Bros. | — |
| Ward, Thos. W., Ltd. | — |
| Waring Bros. | — |
| Warner & Co., Ltd. | — |
| Warrington Red Moulding Sand Co. | 50 |
| Watsons (Metallurgists), Ltd. | — |
| Webster & Co. (Sheffield) Ltd. | — |
| West Midland Refining Co., Ltd. | — |
| Whitecross Co., Ltd. | — |
| Wild-Barfield Electric Furnaces, Ltd. | 4 |
| Wilkinson Rubber-Linatex Co., Ltd. | — |
| Wilson, T. S., & Co. (Graphite), Ltd. | — |
| Witham, L. A., & Co. | — |
| Woking Pattern Works, Ltd. | — |
| Woodward Bros. & Copelin, Ltd. | — |


Published by the Proprietors, Industrial Newspapers (Fuel & Metallurgical), Limited, John Adam House, 17/19, John Adam Street, London, W.C.2, and printed in Great Britain by Harrison & Sons, Limited, by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx) and High Wycombe.

# Tighten up! –

## *and to work with a Norton B.11. wheel*




Rough grinding soft steel castings? A Norton B11 is the wheel to do the job – in this case A14-QB11, 18" x 2½" x 6". It will do it at high speed and with the maximum economy. It will do the work with greater efficiency and maximum economy because its built-in balance minimizes wheel bounce, reduces operator fatigue and so increases both output and wheel life. Advanced manufacturing techniques ensure a fast, free cutting action without affecting the wheel's long life. Stringent grade control maintains consistently high quality performance between any two B11 Wheels of the same specification, enabling grinding costs to be accurately assessed in advance.

In the Norton range of wheels – over 100,000 sizes, shapes and specifications – there is exactly the right one for your job. Let your Norton or Alfred Herbert Representative help you select it; and for high speed fettling, whether for swing-frame, floorstand or portable machines, a Norton B11 Bond Resinoid Wheel will probably be the one for you.

*Get through more work with Norton Abrasives*

*NORTON ABRASIVES

**NORTON GRINDING WHEEL COMPANY LIMITED**

*Welwyn Garden City · Herts · Tel. Welwyn Garden 3484 (15 lines)*

*Enquiries also to* **ALFRED HERBERT LIMITED, COVENTRY** · *Telephone Coventry 89221*

NORTON *and* BEHR-MANNING *factories also in Argentina, Australia, Brazil, Canada, France, Germany, Italy, Northern Ireland, South Africa and U.S.A.*

**Trade Mark of Norton Company, U.S.A.—The World's largest Manufacturer of abrasive products*

NGW. B11.164

# FOUNDRY TRADE JOURNAL

EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 110
No. 2303
Registered at the G.P.O. as a Newspaper

JANUARY 26, 1961
Offices: John Adam House, John Adam St., London, W.C.2

Single Copy, 1/-. By Post 1/4. Annual Subscription, Home 52/- Abroad 60/- (Prepaid)

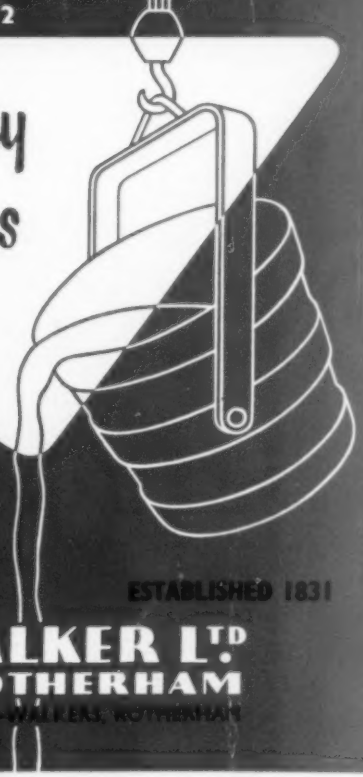


# BLACKING

INCLUDING $CO_2$

and all Foundry Requisites

COAL DUST
CHARCOAL
PLUMBAGO
TERRA FLAKE
BLACKLEAD
CORE GUM
CEREAL BINDERS
'COREITE' LIQUID CORE BINDER
BENTONITE
GANISTER
NON-SILICA PARTING POWDER



ESTABLISHED 1831

ISAAC & ISRAEL WALKER LTD
EFFINGHAM MILLS · ROTHERHAM
TELEPHONE:—ROTHERHAM 4013 TELEGRAMS:—WALKERS, ROTHERHAM

THE ERITH RANGE OF SANDS

Combine a variety of selected LOAMS and SILICA SANDS of guaranteed quality, suitable for every appropriate foundry requirements. In all fundamental respects they are the outstanding sands for present-day practice and are tried and proved by performance and results.

Write for illustrated Brochure and Free Samples to: ESTABLISHED 1805
J. PARISH & CO., ERITH, KENT Telephone No.: ERITH 30256

We know that BENEFLUX and our other exothermics are good—why don't you find out about them by writing to:

ROBSON REFRACTORIES
LIMITED
GURNEY WAY, AYCLIFFE TRADING ESTATE
AYCLIFFE, Co. DURHAM